The Commercial Car Journal

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Cost Figures and Their Importance to the Dealer

Every Dealer Should Gather His Own Cost Records. Exceptional Attention Must be Given New Truck Owners. Dealer Should Interest Owners in Cost Records

THE average motor truck dealer does not consider it his business to keep in touch with a truck owner after a sale has been made insofar as checking up the earning capacity of the truck is concerned. He is interested, of course, in rendering service, as agreed upon, but, aside from that, his interest in the sale ceases—excepting, perhaps, if the truck was sold on the time-payment basis, or when a repeat order is in view.

It is not our intention to indicate that the dealer should become a guardian for every truck he sells, but, on the other hand, if the dealer would take a little more interest in what is being accomplished with the truck, especially from a monetary point of view, the results obtained would be of material benefit to himself as well as the owner. Incidentally, the dealer would indirectly gather a fund of valuable information which would be of service to him in connection with other sales.

What we are alluding to is the idea of the dealer working in harmony with the owner for the purpose of securing accurate cost figures. If the dealer could encourage the owner to keep accurate cost records each side would be benefited.

The Dealer Has No Cost Figures

The criticism today is that the dealer cannot supply his prospect with cost figures; that the dealer does not know himself what it costs to run his trucks. In some instances the dealer may have figures showing what his trucks can do on a gallon of gas; that the tires are guaranteed for so and so many miles; and that altogether she is **some** truck. The owner gets the idea that after he is the possessor of that truck all his transportation problems will be ended and that he will be able to make or save all kinds of money. He will, naturally, save money by using motor power. However, unless he knows what it costs to operate his truck he will not realize where the saving is made. The average owner, especially the former team owner, is very apt to overlook the "fixed charges," viz.: interest on investment, depreciation, insurance, garage expenses, etc. Failure to consider these items has resulted in failure for a large number of truck owners. Note the many inter-city hauling concerns that have failed,—all because of the fact that they didn't know what it cost to operate their truck. If they had kept accurate cost records they would not have tried to do business at such ridiculously low rates. Too many owners think they are making money when in reality they are losing money every day their trucks are in operation. As long as the trucks are busy and the time-payment notes are being paid off everything seems satisfactory. The seemingly "unimportant" items are still eating up profits and continuing unnoticed. Not until a new truck has to be purchased is the item of depreciation considered of any importance.

Cost Figures Vary With Every Installation

This condition does not apply so much to the large fleet owner as it does to the small merchant or the owner of a few machines. The big companies have been through the mill and know better—it's the little fellow that needs the advice. The former knows to the fraction of a cent what it costs to haul a package; a ton per mile; or the cost per trip as the case may be. On the other hand, there are some companies which do not figure the cost so closely and are satisfied to know that it costs so many dollars per day to operate each truck. If these concerns would install a practical cost system they would find that by checking each truck accurately perhaps thousands of dollars could be saved yearly.

Some dealers contend that cost figures do not amount to much anyway; that they are not applicable to the industry as a whole, and that even with two trucks working under identical conditions the results will vary considerably. Of course, they will!

It is a fallacy to believe that any standard set of cost figures can be used as a basis for estimating costs of one or more trucks in various lines of business. Such a set of figures can only be used as a medium for making superficial calculations. The question then arises—what is the use of considering cost figures at all?

The answer is this—that unless the dealer is in a position to offer a prospect some tangible information as to the cost of operating his trucks under certain specific conditions he is simply inviting trouble at some future date.

When a prospect demands information of this character the dealer should exert every effort to give that prospect as complete and specific information as possible. This information should include each and every item that could possibly enter into the cost of operating that particular truck. In other words, it is a better policy to over-estimate than to underestimate, for the reason that should the owner be confronted with business reverses he couldn't very well lay the blame on the dealer or charge it up to the use of motor power. Certainly this does not apply to well established firms who have had considerable experience with motor trucks, but it does apply to those concerns about to change over from horse to motor power. It is upon the proper treatment of such prospects that each dealer's future depends.

Every new truck purchaser will eventually become one of three things,—a satisfied owner, a booster or a knocker. It is the last that the trade should do everything in its power to eliminate. The "knocker" and the dissatisfied owner can kill more sales for any one dealer in any one week than that dealer could make in a year. This is one thing that a great many dealers fail to realize. Therefore, the more thought given to the embryo truck owner the better.

How the Dealer Can Obtain Cost Figures

This brings us to the point as to what the dealer can do to properly sell a prospect. The solution is simple—give him facts and tell the truth. Make only such statements as can be backed up with evidence. In the vernacular don't "kid" the prospect. Give him all the information available and give him cost figures that are as inclusive in their scope as it is possible to make them, analyze every phase of his business that might affect the cost of his truck installation.

From the foregoing it must not be inferred that the keeping of cost records is a complicated matter. On the contrary, the work involved would ordinarily, in the case of a few trucks, take not more than about fifteen minutes of the owner's time each day. In connection with a fleet of trucks the services of a bookkeeper would be required but then the expenses involved would certainly be saved many times over the cost of the necessary clerical help.

Every dealer should have what might be termed an "information file of cost

data." This file should be alphabetically arranged according to business. In it should be placed all kinds of information which could possibly serve the salesman soliciting prospects. Every salesman should be asked to contribute to this file such information—in the form of reports—as he has found from actual experience to be helpful in selling a truck in a specific business. This file should also contain trade journal clippings and articles. In fact, any authentic information which might have some bearing on prospective motor truck sales should be included for reference purposes.

And last, but not least, every set of cost figures that the dealer can secure from his clients should be placed in the file. With the co-operation of the service and repair departments this file can be of value to the sales department.

In this issue there are a number of articles which include cost figures. A careful study of these will show that each firm has its own problems to solve so that what is "good for the goose" is not always "good for the gander." Each kind of business has problems peculiar to it alone and the more conversant a dealer is with that particular line of business his client is interested in the easier it will be for him to close the sale. The average business man will certainly pay more attention to a salesman who shows some facts as to how "such and such concern in the same line" handles its trucks than to one who has to base his selling arguments on generalizations and average conditions.

Fruit Hauled Cheaper by Truck Than by Mules

IN a recent issue of the American Fruit Grower, Edwin B. Wayland, of Virginia, gives some interesting cost figures on the use of a 3-ton motor truck in the Blue Ridge Mountains of Virginia. The truck is a 3-ton chain drive, especially equipped with a 45-hp. motor for use on the mountain grades. In five months this particular truck was run two thousand one hundred and sixty miles, when winter set in and closed the roads. The work which this truck had to perform was of the roughest type, it being used not only for hauling fruit, but also for logging over narrow mountain trails on short hard hauls as well.

In speaking of the work performed by this truck, Mr. Wayland says:

"Two things we have done with the most scrupulous care, selecting a quiet and steady driver particularly for those ends, thorough lubrication and no overloading.

"In running these 2160 miles we hauled 378 loads (counting some light loads on back-hauling, etc.) aggregating a total weight of 2,028,710 lb., using 635 gal, of gasoline and 95 quarts of cylinder oil. This gives us the following averages: 3.4 miles per gal. of gasoline; 22.7 miles per quart of cylinder oil; 5367 lb. as an average load (counting back trips); 5.71 miles as an average length of haul. The total repairs consisted of replacing a broken porcelain in one spark plug.

"The accompanying figures show the comparison we made between motor and mule freighting. We are now starting on our second season. As far as we can tell from our experience, these figures are about as accurate for our conditions as they can be estimated. Our tire expense has been slightly higher than expected on account of advance in rubber and our driver cost on account of many short hauls we made that are not normal. Our depreciation, I believe, is shown too high; also our repairs to truck; for in neither of these can we see any indications yet of reaching the expense we expected. However, on the whole, the variation is so small as to indicate only inappreciable changes.

"The one most important point in the economy that we have found is not merely in the saving over mules in the cost per ton mile. This 10½ cent per ton on 1000 tons (approximately) hauled last season, is only $105 multiplied by our average haul of 5.71 miles, or $599.55 total. The true economy, in our case, is noted when we compare the fixed charges of the truck with that of the mules.

"These fixed charges are based on working 200 days per year. Yet many of those 200 days teams are worked, not because they show a profit by doing so, but because they show less loss than by standing idle. This because our hauling work is very irregular—sometimes very heavy and sometimes almost nil.

"For illustration, using the figures from our sheet, take one of the 200 days when we can get only $3 gross value out of the work of a team. Shall we work it or not? If the team stands in the stable it costs us $5.22 and we get nothing, so we lose $5.22. If we put it to work it costs us $7.60 and we get $3, losing $4.60. So we have got to lose in either case, but lose less by sending the team out to work.

"On the other hand, it costs us only some $393 fixed charges on a truck for an entire year. The fixed charges are only 22.2 per cent. of the total charges per mile. With mules they are 68.7 per cent. Therefore, we are in position to hold our motive power idle in slack times with a vast deal more of economy when it is in the shape of a truck than when it is in the shape of mules, and put it to work to earn a profit and not—a great part of the time—to avoid a greater loss.

"Please let me repeat that this is applicable to our conditions, but may be very far from true for others. Our hauling is necessarily intermittent. At certain rush seasons, as in fruit, we must have it. At other seasons we must get along with as little expense as possible. If the truck had not replaced two 4-mule teams we would have been as badly off with it—if not worse—than we would have been without it. But we got rid of the mules."

Comparison of Hauling Costs

Three-Ton Motor Truck and Four-Mule Team of Two-Ton Capacity

3-Ton Motor Truck. Fixed Charges Per Year:	
Interest at 6% on $4,700.00, First Cost of Truck	$282.00
Interest at 6% on $300.00, First Cost of Body & Equipment	18.00
Fire Insurance, 1½% on $5,000.00	75.00
License	18.00
Total Fixed Charges per Year	$393.00
Total Fixed Charges per Truck-Mile at 4,000 miles per year	.10
Operating Costs Per Mile:	
Tires, 7,000 Miles for $350.00	$0.05
Gasoline, 3.3 Miles per Gallon at 28c	.08½
Lubrication	.01½
Repairs to Truck (Overhauled 10,000 miles for $400.00)	.04
Depreciation on Truck (Less Tires), 50,000 Miles for $4,350.00	.08¾
Depreciation on Body & Equipment, 25,000 Miles for $300.00	.01¼
Driver (37 miles per day at $2.25)	.06
Total Operating Costs per Truck-Mile	$0.35
Total Fixed Charges per Truck-Mile	$0.10
Total Operating Costs per Truck-Mile	.35
Total Cost per Truck-Mile	$0.45
COST PER TON-MILE BY 3-TON TRUCK	.15
4-Mule Team (2-Ton Load). Fixed Charges Per Year:	
Interest at 6% on $700.00, First Cost of 4 Mules at $175.00	$ 42.00
Depreciation on 4 Mules, $700.00 in 10 years	70.00
Interest at 6% on $200.00, First Cost of Wagon, Harness, Etc.	12.00
12 Tons Hay at $35.00	420.00
64 Bbls. Corn at $7.00	448.00
Feeding (done by stock man), 260 days at 20c	52.00
Total Fixed Charges per Team per Year	$1,044.00
Fixed Charges per Team per Day (200 working days per year)	5.22
Operating Costs Per Day:	
Depreciation on Wagon, Harness, Etc., $200.00 in 1,000 days	.20
Shoeing, Repairs, Etc., $3.60 per month of 20 working days	.18
Driver (exclusive of feeding) at $2.00 per day	2.00
Total Operating Costs per Day	$2.38
Total Fixed Charges per Team per Day	$5.22
Total Operating Cost per Team per Day	2.38
Total Cost per Team per Day	$7.60
Cost per Team-Mile (15 miles per day)	.51
COST PER TON-MILE BY 4-MULE TEAM	.25½

Motor Trucks Cut Cost of Hauling in Candy Business

Speed in Making Deliveries Essential, Especially During Summer Months. A Few Typical Examples Showing Advantage of Trucks Over Common Carriers

By C. P. SHATTUCK

AMONG the industries benefiting from prohibition is that which caters to the "sweet tooth." The consumption of candy has increased so rapidly during the past few years that statistics of this industry will surprise those not familiar with its magnitude. It is safe to assert that millions of new capital are being invested in the candy industry, which should afford the truck dealer an opportunity to sell the retailer, wholesaler and manufacturer on motor highway transportation.

The use of commercial cars, particularly of the delivery type equipped with pneumatics, is not new in the candy business, for many candy manufacturers employ them. These vehicles are utilized mainly for local distribution, for supplying the jobber or wholesaler and retail trade, where the radius of delivery is necessarily limited.

Will Purchase Many Trucks

The writer believes that the candy industry will be a large user of motor trucks and that they will be employed on long hauls. The contention is based on observations made during a trip through seven different states in the East. While it is true that the greater number of candy manufacturers and wholesalers are utilizing their trucks for local distribution, the writer found several instances where the manufacturers are developing long distance delivery routes. This is particularly true where the manufacturers maintain branches 20 to 75 miles distant from the source of production.

A large number of selling reasons can be advanced by the truck salesman selling transportation. One very concrete reason is given on the very slip of paper accompanying each package of candy sold. It reads, "Should chocolates purchased during the summer turn slightly gray, it is no indication that their quality has been impaired. Abnormal heat or moisture tends to drive the cocoa butter to the surface, producing a grayish tint."

The writer has been informed that the retailer avoids as much as possible stocking chocolates during the warm weather owing to the effect of the heat, the stock being replenished by more frequent deliveries by the wholesaler or manufacturer. This condition does not exist in the cities and suburbs, but in the outlying districts where delivery is generally accomplished by express.

The remarks by the head of the shipping department of a candy company transacting a gross business of over one million dollars last year on the "disadvantages of the express service" is illuminating. He said that it is not uncommon for an express shipment of candy to become affected by the heat. "We deliver the packages from our cooling room to the express agent and he stores them in a hot room. Next they are placed on hand trucks and run out on a hot platform where the goods are exposed to the rays of the sun. The duration of the exposure varies, but in many instances it is sufficient to impair the quality of the candy. In one instance goods to be shipped on Wednesday were still at the station on Saturday. This may be an exception to the service, but the condition existed nevertheless. Then there are the several handlings which do not improve the goods."

Costs Less Than by Rail

Besides the superior service afforded the retailer by the manufacturer, there is another advantage and one that appeals to the business man and that is costs. Properly operated and with efficient loading and routing, trucks can be run cheaper on a mile-delivery-basis in the candy industry than is possible with the common carriers, and the radius of delivery is not necessarily confined to short distances. Long hauls can be made profitable provided the truck hauls even a partial load on the return, and candy companies maintaining branches can arrange return loads. This is the contention held by one concern that is developing long distance delivery of candy by motor trucks.

Find Trucks Profitable

The Crystal Confectionery Co., Burlington, Vt., has been engaged in the production of candy for over 25 years. Its University Chocolates, marketed under the trade mark of CCC, are distributed over the United States as well as locally. This company has found the use of motor trucks invaluable for distribution of its products. Use is also made of the trucks for hauling raw material of certain kinds from the freight terminals to the plant. The bulkier and heavier products entering into candy, such as peanuts, coatings, sugar, syrups, etc., which are purchased in very large quantities, are hauled by large capacity motor trucks on a contract basis.

Up to within three years ago the company utilized the common carriers and horses. Decision was made to purchase trucks and two Reos were placed in service, being utilized for local distribution and for supplying the suburban trade. At first some of the officials of the company were skeptical as to the practicability of the truck owing to the steep grades and poor quality of roads in and around Burlington, but as time went on and the trucks proved dependable under the most severe conditions, the scope of delivery was increased.

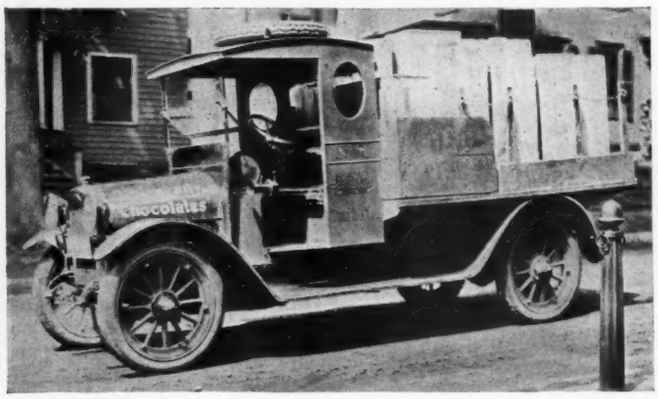
The original trucks have been replaced by two new models of the same make, and a third has since been added. All are equipped with pneumatic tires and one machine is fitted with a platform.

Delivering Soft Candy on a Hot Day With Trucks is Far Superior to Former Methods as the Confection is Not Exposed as Long to the Deteriorating Action of Heat. The Loading Platform Convenient to Shipping Department, Conserves Time

type of body, while the others have the conventional covered delivery bodies. Two machines are located at Burlington and the third at the company's branch at Rutland, Vt., 70 miles distant. The factory cars are used to deliver locally and in the suburbs, having a radius of about eight miles in summer and three in winter. It is explained that they have much snow in Burlington and it is not always feasible to send trucks outside of the city during the winter months. The winter of 1918-19 was an exception, however.

Inaugurate Long Hauls

Early this summer the manager of the company decided to make long distance trial trips, sending one of the Reos to Rutland, involving a round distance of



One of the Trucks is Equipped With a Stake Platform Type of Body.

140 miles. The first trip was made on June 24, the car transporting 3200 lb. of candies and the trip was completed in one day and two hours. A record was maintained of the costs of the trip and the figures supplied are as follows:

12 gal. Gasoline @ 28 cts.	$3.36
¾ qt. Oil	.15
140 mi. @ 5 ct. the mi.	7.00
Driver and Meals	3.50
Insurance	.24
Depreciation at 20%	.82
	$15.07

Truck and body cost $1540.

The Reo started back with 1030 lb. on the return trip from the Rutland branch, distributing it to the various customers. This not only conserved the time of the Rutland truck, allowing it to greatly increase its radius of operation, but also provided a return load for the former truck. An interesting comparison was made of the distributing costs of this 4230 lb. It was based on the haul between Burlington and Rutland by truck and by freight. According to the manager of the company, who has supervision of the transportation department, the cost by freight, not express, would be as follows:

4230 lb. @ 34 cts. the 100	$14.38
War Tax	.48
Horse Delivery to Burlington R. R.	2.50
Horse Delivery at Rutland	1.50
	$18.86
Balance in favor of truck	$3.81

The success of this haul, both because of the cheaper transportation and better service, led to the establishing of another route to Woodsville, N. H., 81 miles distant or 162 miles round trip. The costs of the first trip were as follows:

17 gal. Gasoline @ 28 cts.	$4.76
1 pt. Oil	.10
162 mi. @ 5 cts. the mi.	8.10
Driver and Meals	3.75
Insurance	.24
Depreciation	.82
	$17.77

The cost of shipping the merchandise by freight, including the war tax, was estimated at $23.79 and adding delivery to the freight terminal at Burlington and from the freight at Woodsville, or $3.50, would bring the total costs to

The Reo Loaded and Ready for a Long-Distance Trip

$27.29. A still larger amount was credited the truck on that trip, as a load of soda tanks were brought back to Burlington, for which the sum of $8.08 was paid for transportation. It is explained that the haul was made to accommodate a local merchant.

Another record of the costs of a round trip to Rutland selected from the cost book showed a saving of exactly one dollar over freight:

12 gal. Gasoline @ 28 cts.	$3.36
1 pt. Oil	.10
140 mi. @ 5 cts. the mi.	7.00
Driver and Meals	3.50
Insurance	.24
Depreciation	.84
	$15.04
Freight and War Tax	$12.54
Horse Delivery	3.50
	$16.04

These figures are based on freight costs instead of express, although much of the material would have been shipped by express as there would not have been any charge for delivery. The costs by freight are, therefore, utilized as a basis of comparison by the official in charge of the transportation department and who supplied the figures quoted.

The Reo at the Rutland branch has been the means of greatly increasing the scope of deliveries and has proved a business-builder. Its maximum radius is 125 miles and the average daily mileage is from 45 to 55 miles. Statement is made that when the truck was first placed in service and for some time afterward, it proved a source of attraction to the storekeepers and public in general who were accustomed to seeing transportation interests served by rail and horse.

Trucks Increase Business

The use of trucks in the country districts has proved a business-builder and were it possible to estimate the value in advertising it would furnish some interesting data. The company states that the use of trucks has greatly improved its service, that its customers appreciate the ability of the company to promptly supply candy and deliver it at the store on the same day as ordered which was not possible under the former conditions.

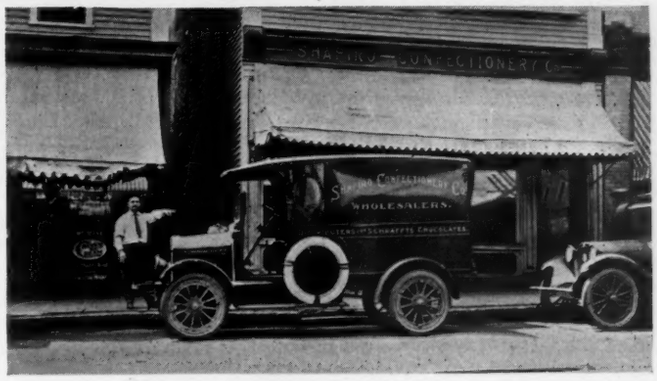
It should be mentioned that much of the territory covered by the Rutland and Burlington trucks is peopled with summer residents and includes many resorts, and the demand at times for sweets is such that a storekeeper cannot accurately gage the demand. The condition of the candy is a factor in sales and inasmuch as the consumers are not educated to the fact that the slightly grayish tint of the chocolate does not impair the quality of the confection, they buy largely with their eyes, consequently successful merchandising in hot weather depends largely on stocking fresh goods and use of truck has made this possible.

Development of return loads was being inaugurated when the writer visited the plant of the Crystal Confectionery Co. and this is being done largely through efficient routing. An effort is being made to have the Burlington truck running to Rutland on a direct run pick up and deliver small lots to the stores on the return trip. It also is being utilized to bring back stocks and empties from the Rutland branch. In addition to the runs to Rutland and Woodsville the local trucks deliver in Burlington and vicinity. Statement was made that the scope of long distance delivery would be increased and that wherever practical the trucks would replace the freight and express service as the losses by freight through softening of candy are avoided.

Believes Trucks Cheaper

The Shapiro Confectionery Co., Lewiston. Me., is another concern that is sold on the use of trucks in the candy industry. This company has the State agency for a well known brand of candy and maintains a corps of four traveling salesmen, all of whom use passenger cars which, the head of the company says, are considerably cheaper than the common carriers when the volume of business transacted and territory covered are considered. Use is made of the passenger cars to carry samples and occasionally to fill special or rush orders when the trucks are not available.

Vim Truck in Service With Shapiro Confectionary Co., Lewiston, Me.



Use is Made of the Reos by the Crystal Confectionery Co., to Haul Emergency Supplies.

The company employs a Dodge commercial car for local delivery, and in April placed a 1500 lb. capacity Oldsmobile in service. This truck is employed for deliveries within 50 miles of the city and warehouse and a Vim is utilized for local deliveries and for distribution in Auburn across the river. Deliveries beyond 50 miles are made by freight. The steam and electric service are said to be very satisfactory.

Mr. Shapiro said, in speaking of the results obtained with the trucks, that they had not lost a day since placed in service. He estimates that the Oldsmobile has traveled about 12,000 miles to date. Equally good service has been obtained from the Vim truck and Mr. Shapiro is one of those few owners who when asked as to the service rendered on his trucks says that it is perfectly satisfactory. He would not consider the use of horses for even local delivery as they would not, he said, permit rendering the service his customers expect nor could horses be operated as cheaply as the trucks.

The writer talked with another candy manufacturer in Massachusetts who is using trucks. At first the machines were employed to haul the raw material to the plant and to transport the finished product to the railroads, but when freight embargoes began to interfere with distribution the trucks were utilized for longer hauls. The length of the haul has been gradually increased and service to the trade vastly improved.

Requires Careful Analysis

The writer ventures the opinion that salesmen attempting to interest candy concerns have not gone deep enough into the details of the distribution problems of this industry. According to the candy companies using trucks the dealer that had sold them did so more on a basis of local distribution, emphasizing the superior speed of the trucks and lower cost. The suggestion is made that the prospect can be interested in any concrete and practical suggestion as to routing his distribution and the use of the truck for what may be defined as long hauls. In other words, if the salesman will carefully analyze conditions, supply some real cost figures, he will sell the prospect some transportation which is a better method than that of "selling" trucks. The candy industry will absorb many trucks during the next few years and it will pay the dealer to investigate and exploit this lucrative field.

The Value of Cost System is Incalculable. Textile Manufacturer Appreciates Its Advantages

An idea of operating costs in the textile trade with a single medium-sized truck may be had from the experience of Robert Krook, of Manayunk, Philadelphia's chief textile suburb. Mr. Krook manufactures yarns for blankets, carpets, art squares and coarse caps. He bought a three-ton Packard truck with a high stake type of body and disposed of two teams and discharged one of his two drivers. While the two drivers used to begin work at 8 a. m. and end at 5.30 p. m., now his driver has finished work for the day, as regards actual driving, at 2 p. m. The rest of the day he spends in immediate care of his truck, thereby keeping it in first-rate condition; or in other work about the place. There is plenty to do, for the mill has its own well-equipped garage and repair shop.

Here are some figures showing costs:

Initial cost of 3-ton Packard truck $4300.00
Insurance (per year) 231.70
Depreciation per year .....30 per cent.
Average run of truck per day, 30 miles.
Gasoline @ 26 cts. per gal. used at average rate of one gal. to five miles.

To every 30-mile trip, about one pint of cylinder oil, bought in 150-gal. orders at 68 cts. per gal.

Cup grease, bought two pails at a time, at $1.25 per pail, lasting one year.

Ten dollars per year added to lubrication cost through frequent oil baths for chassis openings and drainage at regular intervals, changing oil.

Driver's wages (per week) $28.50
Cost of repairs, thus far, per year. 50.00

For the year 1917-1918, Mr. Krook estimated his operating costs at $1150 outside of tire depreciation, which at that time was only nominal. This sum includes his driver's wages. Whether motorization has proved economical may be seen when a glance at Mr. Krook's books for the period prior to that time show that for the last six months he used teams, they cost him $1414.

Ordinarily the truck will make about six stops in averaging its 30 miles per day of nine hours. Loading time will often take about four and one-half hours. A fair load one way—return loads are taken as often as possible—will be about 8000 lb. However, Mr. Krook makes an effort to keep the load as near a maximum of 7200 lb. as possible.

Firestone Capital Increased

AKRON, O., Oct. 28.—The constantly increasing business of the Firestone Tire & Rubber Co. has made it necessary for them to increase production capacity. Accordingly, the company is about to issue $10,000,000 of preferred stock at 7 per cent., payable in quarterly dividends. The stock is offered for subscription, subject to allotment. It is being issued to cover the expense of new buildings and additional up-to-the-minute equipment.

Highway Motor Transportation and the Colorado Public Utilities Commission

By CHAS. M. SMYTH

THE hauling of interurban freight by motor truck upon the highways of Colorado has attained sufficient magnitude to attract the recent attention of the law makers of the state. In 1915 a law was passed and became effective placing all common carriers under the regulation of the State Public Utilities Commission. Freight hauling trucks and public-passenger cars automatically came under the regulation of the commission.

But "regulating" the railroads occupied so much of the Commission's attention that motor transports were quite overlooked. In 1917 the legislature amended the laws governing common carriers in an attempt to bring highway transports a little closer under the Public Utilities Commission. But failure to make provision for deputies to keep in touch with public freight hauling trucks still handicaps the Commission. Many individual truck owners and transportation companies of mushroom growth have launched into the freighting business, and through failure to make a profit have launched out again, and the Commission has been none the wiser of the venture.

Low Rates Led to Bankruptcy

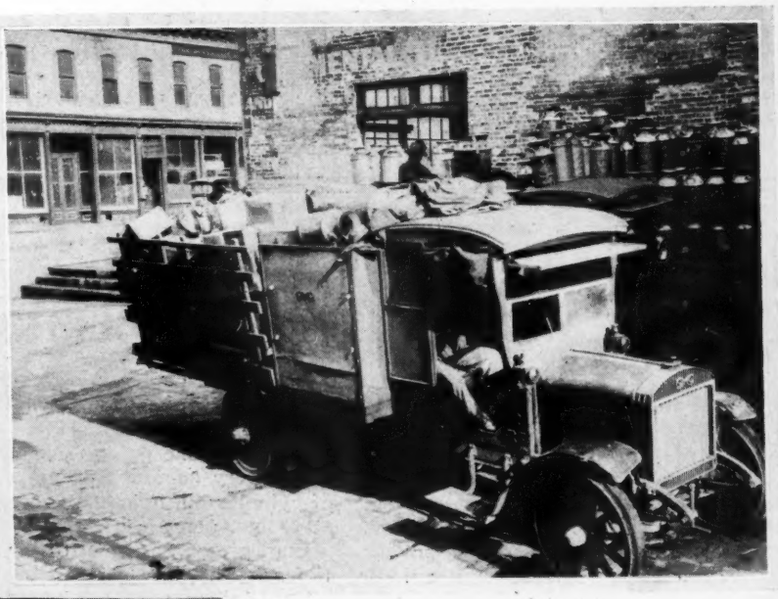
Truck owners who operated public freight hauling trucks previous to the enactment of the law did about as they pleased, and to a considerable extent continue doing so. Those operators who were shrewd enough in doing business to charge sufficient to cover all expenses and leave a profit have maintained continuous service. But those who have made the venture without sufficient forethought have lost money and quit. The chief mistake of freighters who have failed has been the overlooking of terminal expenses and the depreciation of their trucks through wear and breakage.

The lawmakers of Colorado have tried to correct the possibility of such mistakes in the future by ruling that owners or operators must file with the Public Utilities Commission their schedules of rates, routes and service before a certificate permitting them to operate can be secured. The Commission has spent much time and labor in attempting to initiate an equable rate within the bounds of safety for the operator and not too exorbitant for the shipper.

From correspondence with Mr. Charles E. Neil, rate expert of the Colorado Public Utilities Commission, too voluminous to reproduce here in full, I glean the following important paragraphs:

"During the years 1917 and 1918 the Commission co-operated with the Highways Transport Committee of the National Council of Defense, with especial regards to establishment of rates and charges. * * * Pending the consideration of equitable bases of rates the operators were advised to adopt the temporary expedient of adding together the first class railroad freight and express rates and dividing the sum by two. It was well realized that this method could not be made permanent, for many obvious reasons. As rapidly as possible plans were begun to arrive at a more perfect adjustment, consideration being given to all the known factors of transportation, such as cost of service, competition, etc. Experiments were conducted by certain of the larger truck companies to determine, as nearly as possible, the cost of service. The result of such experiments, which extended over quite a period of time was as follows, according to the operators:

Itemization	With 1-ton Unit		With 2-ton Unit	
	Cost	%	Cost	%
Gasoline and lubricating oil	$.0204	11.0	$.01725	11.8
Tires	.0209	11.3	.00925	6.4
Repairs and maintenance	.0133	7.2	.00680	4.7
Driver (and helper)	.0742	40.3	.05745	39.7
Depreciation (at 25 per cent.)	.0484	26.2	.04885	33.7
Miscellaneous (other costs)	.0074	4.0	.00530	3.7
Cost per ton mile	$.1846	100.	$.14490	100.



Above: This G M C Truck Hauls Milk From Brighton to Denver, a Distance of Nearly Thirty Miles, for Twenty-One Cents a Can, and Hauls Return Freight With His Empty Cans for Twenty-Five Cents Per Hundred.

Left: The Utilities Commission Advocates a Rate of 48.4 Cents on Freight to Boulder From Denver, Yet This White Truck Carries Big Loads Over That Route Every Day for Thirty Cents and Makes a Good Profit.

"As may be understood, these figures were only approximated, as the difficulty of accurately and definitely determining each unit of such cost involves a great deal of time and labor, with infinite calculations and records. * * * In ascertaining basic rates of truck carriers there are as many factors to be considered as in the determination of railroad freight rates or express service, such as: cost of service, value of service, length of haul, volume of traffic, value of service to shippers, value of goods, terminal expenses, etc. * * *

"The two units of a rate are the terminal cost and the transportation cost. The former remains constant and the latter varies with the distance involved. The transportation cost and charge should decrease in inverse ratio to the increase in distance. * * * In formulating the system of rates commented on herein a terminal charge of 20 cents per 100 lb. was fixed. This, it must be admitted, was but an approximation, arrived at through investigations of the Commission. It is noted that the recent order of the Nebraska Railway Commission, effective July 1, 1919, predicates the truck rates upon a basis of 15 cents per hundred pounds for the terminal charge. * * *

Rate Should Vary With the Distance

"In attempting to establish an equitable fabric of truck rates which might be applied in Colorado, and based on conditions in that state, numberless basic rates were utilized in experimentation, keeping in view the fact that the rate should vary directly with the distance and should not result in less per ton mile than the average cost, which was found to be 18.46 cents for one-ton units. The greatest distance used in the tables was 100 miles, a distance probably in excess of the scope of operations of truck lines. * * *

"Two scales were finally evolved by the use of a base rate of 30 cents (terminal charge of 20 cents plus 10 cents) for a distance of 5 miles with 5-mile rate progressions. In the first, constant progressions of 3.684 cents per each five miles were applied, and in the other was used additions of 5 cents per each five miles from 5 to 40; 4 cents from 40 to 55 miles; 3 cents from 55 to 80, and 2 cents from 80 to 100 miles. The scales thus determined, together with the ten-mile rate, are as follows:

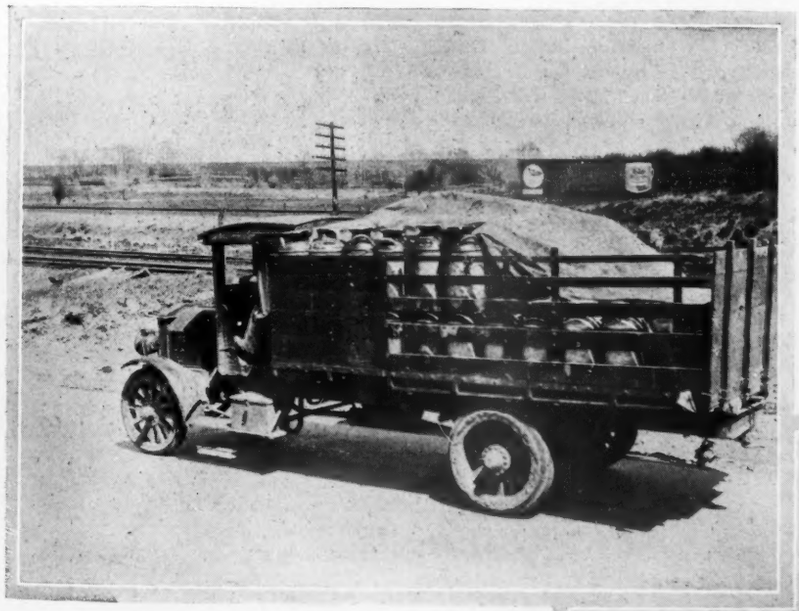
	Scale 1 rates		Scale 2 rates	
Miles	Per 100 lb.	Per ton mile	Per 100 lb.	Per ton mile
5	30.0	120.0	30.0	120.0
10	33.7	67 4	35.0	70.0
15	37.4	49 8	40.0	53.3
20	41.1	41.1	45.0	45.5
25	44.7	35.7	50.0	40.0
30	48.4	32.3	55.0	36.7
35	52.1	29.8	60.0	34.3
40	55.8	27.9	65.0	32.5
55	66.8	24.3	77.0	28.0
80	85.3	21.3	92.0	23.0
100	100.0	20.0	100.0	20.0

"As will be readily seen from the foregoing, no scale of rates can be fixed which will be immune from exceptions; for competition will depress, and mountainous conditions may increase any set rate."

Mr. Neil continues in his communication by calling attention to the fact that the above rates are only for first class merchandise, and says that in contradistinction to such rates those engaged in highway motor transportaion in Colorado have in most cases charged a flat

"Comparative examples of the above scales to competitive points with railroads as follows (in cents per 100 lbs.):

	First class freight	R. R. express	Scale 1	Scale 2
Denver to Boulder (miles: rail 29, motor 28)	36.5	93	48.4	55
Denver to Greeley (miles: rail 52, motor 56)	44	110	70.5	80
Colorado Springs to Pueblo (miles: rail 45, motor 44)	54	88	59.5	69
Denver to Palmer Lake	50	82	66.8	77



Left: The Utilities Commission's Rate for Fifty Miles Would be Around Sixty Cents Per Hundred. This Federal Truck Hauls Milk That Distance Every Day From Castle Rock to Denver for Thirty Cents a Can, Being a Hundred Pounds, and Returns With Freight for the Same Price.

Below: Despite the Fact That the Colorado Utilities Commission Advocates a Rate of 70.5 Cents Per Hundred Pounds From Denver to Greeley, This G M C Truck Has Hauled Freight to That Place From Denver for Fifty Cents Per Hundred for Years, and Made Money.

rate for freight—be it fruit, hardware or bulky furniture. Mr. Neil has also compiled a table of rates for the lower classes of freight, with stated increases for five-mile progressions. He suggests that the different classes of freight should be considered by motor transports the same as railroads have always done.

Special Commodity Rates

As the field of operations for the motor transport increases and the amount of traffic multiplies, Mr. Neil thinks the operator will desire to establish special commodity rates for specified material for which there is a steady movement. I find that operators have been and are still doing that very thing around Denver. For instance, the Windsor Farm Dairy, a local pasteurizer and milk distributor, receives over a thousand cans of milk at its doors each day. Over 90 per cent. of this is hauled in by motor truck from the outlying towns and farms. While Mr. Neil has established a rate of 66.8 cents and 77 cents from Denver to Palmer Lake, a distance of 51 miles, Thomas F. Stills hauls milk from Castle Rock, a town on the same route but some ten miles nearer Denver than is Palmer Lake, for 30 cents per can ot 100 lb. Before prices of all things advanced he used to haul for 25 cents a can. He claims to be making money and must be, for he has worn out two trucks and is now on his third. Mr. Neil's rate to Greeley, a distance of 56 miles, is 70.5 and 80 cents per 100 lb., and Wm. Fuller hauls milk from Brighton, a town on the same route more than half way to Greeley, for 21 cents a can of 100 lb. The Liberty Transportation Co. hauls freight to Greeley for 33 cents per hundred lb., and the Denver & Greeley Motor Co. delivers freight to any point in Greeley for 50 cents. All other motor transport rates seem to be proportionately lower than have been established by the Public Utilities Commission and my curiosity is aroused as to reason for this. Up to date it appears that the Commission has found difficulty in compelling operators of highway transports to adhere to the suggestions of the Commission. One operator suggests that the Commission is raising the rates as an alluring offer to operators to come under the "protection," and incidentally the control, of the Commission, so that if in the future the conditions should return to those which prevailed previous to the war, when railroads found difficulty in maintaining profitable service, the trucks compelled to charge high rates would not be such a menace to railroad business. On the other hand perhaps the Commission is merely attempting to establish rates which will guarantee a safe margin of profit to all operators, and which will eliminate failures and consequent losses.

Nevertheless the Public Utilities Commission of Colorado has done much of benefit to highway transporters of the state, and with a little closer co-operation from other public offices and the operators themselves, this Commission will be able to place the freight hauling trucks of the state upon as sound a business foundation as that now enjoyed by the railroads. It is interesting to note that Colorado, which is supposed by many Eastern manufacturers to be almost off the map, is increasing her truck orders to such an extent that these manfacturers are compelled to change their opinions.

Cost of Operating One-Ton Truck in Transportation Business

The following costs are those of the operation of a 1-ton, worm driven Ford in service with a transportation company engaged in hauling farm produce to the city 75 miles distant, involving a round trip of 150 miles. Figures are given for 75 miles only inasmuch as two trucks are used, one making the return trip while the other starts for the city. Attention is called to the fact that no allowance is made for repairs, it being believed that these can be undertaken by the owners of the trucks. Neither is any charge included for grease.

Ford One-Ton Truck

Operating Charges:	Cost per Mile	Trip Cost or Daily	
Tires	.45	$3.41	
Gasoline 7½ gal.	.28	2.10	
Oil 2 qts.	.05	.40	
Driver	.05	5.00	
			$10.91
Fixed Charges:	**Yearly.**	**Daily.**	
Interest at 6 per cent. on $1168	$78.08	.23	
Insurance	175.00	.58	
Depreciation 33 1-3 per cent.	389.33	1.29	
Garage, office, telephone, light, etc.	180.00	.60	
			2.70
			$13.61

The cars are equipped with pneumatics, 30 x 3½ in. in front and 32 x 4 rear and the mileage cost is based on a guarantee of 3500 per tire. The garage charge of $15 the month covers office as well as telephone and light, the operators of the machines having leased a large barn. Both of the owners drive but charge against each truck a driver's wage. This is a profit in one sense of the word but the amount rightfully belongs in the operating expenses. The trucks are averaging 10 miles to the gallon which figure is based on several weeks' operation.

Lumber Hauled Cheaper by Motor Trucks

According to an article appearing in a current issue of the *Diamond T Accelerator*, published by the Diamond T Motor Car Co., the Thornton-Clancy Lumber Co., of Chicago, knows just what their trucks are costing them. Therefore, the cost figures which were obtained from this lumber company are interesting. In order to simplify the reading of these figures they have been tabulated so as to make comparisons easier. Let us first consider the work done by the two trucks. They carried an average of 408,422 ft. of lumber in twenty-five days at an average cost of $1.53 per thousand ft., based on a daily operating cost of $25 per truck. Based on a daily cost of $9 for each double team, the three teams delivered an average of 137,706 ft. of lumber at $1.64 per thousand, and the two single-horse teams at a cost of $7 per day delivered an average of 59,947 ft. in the month at a cost of $2.91 per thousand.

Even though the trucks had heavier loads and longer hauls they delivered over three and a half times as much lumber as the double teams, and over six and a half times as much as the single teams and at less cost.

Further investigation shows that Truck No. 2 actually delivered more lumber than all three double teams combined, for they carried a total of 413,118 ft. It cost $1.64 per thousand ft. by using these three double teams, as compared with $1.45 by Truck No. 2, or a saving of 18 cents per thousand ft. in favor of the truck. Each month $41 has been saved by using this five-ton truck in place of three double teams.

DELIVERY RECORD FOR JUNE, 1919, FOR SOME OF THE TEAMS AND TRUCKS OWNED BY THORNTON-CLANEY LUMBER COMPANY, CHICAGO.

Kind of Vehicle Used.	Total Number of Feet Delivered.	Number of Days Operated.	Number of Feet Delivered per Day.	Estimated Cost of Trucks and Teams per Day.	Total Cost of Teams or Trucks	Cost of Delivery per M. Feet.
Truck 1 — Diamond T, 5-ton truck	385,537	25	15,421	$25	$625	$1.62
Truck 2 — Diamond T, 5-ton truck	431,306	25	17,252	25	625	1.45
Team 1 — double team	113,416	24	4,726	9	216	1.90
Team 2 — double team	153,276	25	6,131	9	225	1.47
Team 3 — double team	146,426	25	5,857	9	225	1.54
Team 4 — single team	68,888	25	2,756	7	175	2.54
Team 5 — single team	51,006	24	2,125	7	168	3.29

Average cost per thousand feet, using two 5-ton Diamond T's $1.53
Average cost per thousand feet, using three 2-horse teams 1.64
Average cost per thousand feet, using two 1-horse team.. 2.91

G. Norman Baughman Company, automobile supply jobbers with headquarters at Tampa, Florida, and a branch at Jacksonville, have recently opened another branch at Miami.

Cost Figures on Delivering Coal

Lyman Coal Company States That Pneumatic Tires Decrease Cost of Hauling and Also Lower Repair Bills

By C. P. SHATTUCK

THE use of pneumatic cord truck tires is not generally recommended where the load is dense and heavy as perhaps in the coal industry, but the Elias Lyman Coal Co., Burlington, Vt., has, after considerable experience with the big casings, concluded they are more efficient and economical than the solids. Four of the seven trucks in service with this company are now pneumatic equipped, and the cost figures of these trucks appear to sustain the contention of the company as to their economy.

Decide to Standardize

The Lyman Coal Co. began experimentation with trucks in 1916. at which time it owned twelve teams and during the busy season operated as many as twenty-five. The first truck, one of 2½-ton capacity, was utilized for general delivery, but was found too large and was exchanged or traded in for a smaller unit. Despite the severe conditions under which a truck operates in and around Burlington, there being stiff grades and none too good roads outside of the city, the second truck proved so satisfactory that it was decided to replace the horses with machines. Like many other concerns making a large investment in a fleet of trucks, it was decided to standardize and the Mack make was selected.

Early in 1917 three 2-ton Macks were placed in service and these were equipped with solid tires. A 1-ton was added that fall and two 1-ton and one 2-ton purchased early in 1918. The last 2-ton bought was equipped with 36 x 6 in. pneumatics front and 40 x 8 rear. Trucks numbers 5, 6 and 7 are fitted with 37 x 5 pneumatic front and 38 x 7 rear. Numbers 1, 2 and 3 are equipped with solids, 36 x 7. It should be mentioned that the company began its experimentation with pneumatics in 1916, the first truck having the large casings.

Large Suburban Trade

The Lyman Coal Co. not only transacts a large business in the city, but makes deliveries in considerable volume to surrounding towns. One of these is Winooski, a round trip of seven miles, and in this place is a large corporation that purchases coal and resells to its employees. As a rule ton and half-ton lots are ordered and delivered from the yard of the Lyman Coal Co. Deliveries are also made to Williston, 8 miles distant; Shelburn, 7 miles, and Essex Junction, 8 miles. As a rule two round trips are made per day to these points.

During 1917, which will be recalled as an unusually severe winter—and they experience real winters with lots of snow in Burlington—the Mack trucks were on the job every day. Statement is made by a member of the company that the trucks were the only ones in service in the city, and the drivers relate interesting experiences ploughing through the big drifts, these machines equipped with big pneumatics experiencing the least trouble in obtaining traction.

In speaking of the big pneumatics, N. E. Pierce, vice-president of the company, quoted an incident that he said proved conclusively the value of the big shoes. A creamery several miles distant was handicapped in its transportation department and to accommodate the owners the Lyman Coal Co. loaned its No. 4 truck, a 2-ton equipped with big pneumatics. This machine transported 87 cans of cream in one load and 37 in another, covering 97 miles from the time the machine left the garage until it returned. It averaged 9¼ miles to the gallon on fuel. It left the garage at 10.30, was back at 5.45 and the driver took the customary hour for lunch. "This would not have been possible with solids," said Mr. Pierce. "We also find that we obtain about seven miles on the average to a gallon with the pneumatics and about five with the solids. Our repair bills are considerably less and our mechanic states that he has less work to do in tightening up nuts and bolts." This company states that the same truck had no repairs after a service of one year and up to August had traveled 5941 miles. Cost figures appended herewith for three months also show no repair bills for this truck. No. 6 truck also has a record of 12,700 before any repairs were necessary.

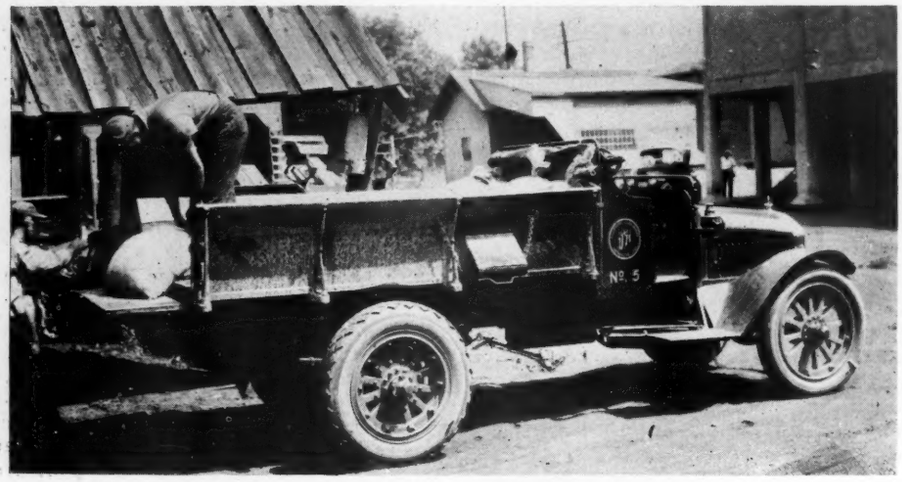
Changed Unloading Methods

This is not intended to a tire article, but Mr. Pierce and his mechanic were enthusiastic over the big pneumatics. Like many concerns trying out a truck before replacing horses, the company found it was necessary to change its unloading methods. At first when compared with horses the truck did not prove as efficient, the team doing about 50 per cent. more work. This was largely due to the short hauls made by the truck and not carrying sufficient helpers to quickly unload the coal. It was found that considerable time was lost in unloading, so an extra man was placed on the truck and the results desired were

Fleet of Seven Mack Trucks in Service With Lyman Coal Company, Burlington, Vermont
These trucks are said to be the only cars that operated during the severe winter of 1917

obtained. As a rule the average load is accompanied by two men in addition to the driver.

Costs are always of interest. Mr. Pierce, in speaking of the work of the Macks, said that the total cost of delivery in 1917 was less than the previous year and that conditions were more favorable to the trucks, as the greater number of deliveries were in half-ton lots. It will be recalled that the Government took over the control of coal at that time and it was doled out in small quantities, particularly in New England. Mr. Pierce also stated that for short hauls the horse was cheaper, but the high cost of long deliveries was prohibitive with teams. The company has entirely dispensed with its horses and its fleet is capable of meeting any requirement in the transportation of coal.



Loading Bag Coal at a Pocket
Note the chute at the side of the body for delivering loose coal

No Overloading of Trucks

Overloading of trucks is not permitted. The 2-ton machines carry two tons and the smaller one ton. This rule is strictly enforced, as the company does not believe low cost of transportation is obtained by overloading. It eventually is paid for in the repair and replacement bills. The company has constructed a large and practical garage at its yard and employs a high-grade mechanic, who looks after the machines and does the overhauling. Machine and heavy work is sent outside. The garage is equipped with conventional tools, a compressor for the pneumatics, etc., and a record of tire mileage, oil and fuel consumption, idle days, etc., is maintained. Records are also maintained of the tonnage carried by each truck. Accompanying figures give this data. The drivers have 30 minutes each day for lubrication and inspection of their trucks and this is supervised by the head mechanic. There is no stated time for an overhaul of a machine, the policy being to attend to adjustments and forestall a general overhaul. The crankcases of each engine are emptied, washed and the oil supply renewed every 700 miles. The lubricant in the differential and gearset is renewed monthly.

Two sets of cost figures were supplied the writer by the company. Those dealing with trucks Numbers 1, 2 and 3 are for 11 months ending June 1, 1917. The figures are not complete in that they do not include the cost of tires per mile, license, insurance or garage charges. They are of interest, however, in that they show the three trucks traveled a total of 17,165 miles and hauled 9245 tons of coal, the greater part of which was hauled during the severe winter of 1917.

Deliveries Vary Considerably

Cost figures for the months of April, May and June of the present year are appended, and during this time the fleet hauled 3419 tons, traveling 9205 miles. The cost figures include interest on the investment of the garage, which cost $4980, depreciation on garage, but no insurance, as none is carried. There is also included the salary of the mechanic, which is divided equally among the seven trucks. Tire costs are estimated on the list price, the cash discount not being deducted. The tires, pneumatics, are Goodyear, all-weather cords. It will be noted that the average daily cost of the No. 1 truck is strikingly greater than the other similar capacity machines. This is due to an overhaul and the fact that the truck was in service but 26 days. The daily cost is estimated on the number of days the truck was in service. The variation in cost per mile and per ton, average, is due to the routes, short and long hauls.

Truck No. 1

Total miles	7,955	.....
Net tons	2,499	.....
Gals. gas	1,697	$441.22
Gals. oil	42	*17.30
Days worked	244	.....
Labor	....	1,266.04
Repairs	....	736.65
Depreciation 20 per cent.	....	335.11
		$2,796.32
Average daily miles		32.6
Average daily tons		10.02
Average cost per mile		$0.35
Average cost per ton		1.11
Average cost per day		11.46

Truck No. 2

Total miles	4,643	.....
Net tons	2,923	.....
Gals. gas	1,498	$389.48
Gals. oil	43	*18.20
Days worked	174	.....
Repairs	....	494.55
Labor	....	820.99
Depreciation 20 per cent.	....	633.00
		$2,356.22
Average daily miles		26.7
Average daily tons		16.8
Average cost per mile		$0.51
Average cost per ton		.81
Average cost per day		13.54

Truck No. 3

Total miles	4,567	.....
Net tons	3,823	.....
Gals. gas	1,878	$488.28
Gals. oil	51	*22.40
Days worked	211	.....
Repairs	....	424.95
Labor	....	1,311.01
Depreciation 20 per cent.	....	781.66
		$3,028.30
Average daily miles		21.6
Average daily tons		18.1
Average cost per mile		$0.66
Average cost per ton		.79
Average cost per day		14.35

* Includes grease.

Truck	Days	Miles	Tons	Gals. Gas	Gas Cost	Gals. Oil	Oil Cost	Cost of Truck	Interest on Investment	Depreciation 25%	Insurance	Repairs	Wages	Garage	Labor	Tires	Av. Daily Miles	Av. Daily Tons	Av. Cost Per Mile	Av. Cost Per Ton	Av. Daily Cost
No. 1.....	26	512	267	100	$25.50	4¾	$1.71	$3,240.00	$48.60	$202.50	$35.01	$70.00	$134.16	$15.49	$52.00	$21.93	19.6	10.7	$1.18	$2.27	$23.30
No. 2.....	66	1,378	742	321	81.86	4¾	1.71	3,200.00	48.00	200.00	36.12	29.40	340.56	15.49	52.00	58.97	20.8	11.2	.62	1.16	13.10
No. 3.....	59½	1,267	639	280	71.40	4½	1.62	3,395.00	50.93	212.19	35.73	27.25	307.02	15.49	52.00	54.30	21.4	10.7	.73	1.29	15.59
No. 4.....	69	1,885	781	329½	84.02	5⅝	2.03	3,733.25	56.00	233.30	31.94	.....	356.04	15.49	52.00	105.74	27.3	11.3	.49	1.19	13.57
No. 5.....	44½	1,175	258	210	53.55	3¾	1.35	2,372.15	35.58	148.26	35.75	4.50	125.94	15.49	52.00	62.15	26.4	5.8	.45	2.07	12.01
No. 6.....	70	1,562	385	287	73.19	6½	2.34	2,577.35	38.66	161.08	36.13	180.40	198.10	15.49	52.00	72.62	22.3	5.5	.53	2.15	11.85
No. 7.....	62	1,426	347	249½	63.63	6	2.16	2,387.15	35.86	149.19	37.12	18.25	175.46	15.49	52.00	75.43	23.3	5.6	.43	1.79	10.07

Hauling Aggregates by Motor Truck on Concrete Road Construction

ROAD construction cost data as generally available is compiled only on the basis of the price of materials and labor, the amounts of material needed, the distance over which they must be transported to the job and the cost of placing them. Such data is of little value to anyone except to the man who gathered them, for he is the only one who understands the conditions peculiar to that job, the condition of the contractor's plant, repair costs, depreciation and interest on investment, and other information having a direct bearing on the actual cost of building improvement.

Having available only such incomplete data it is difficult to determine the relative costs of different methods of handling certain features of construction. The difference in organization of the gangs too will cause differences in the unit costs of identical improvements under similar conditions. The loose, incomplete cost data generally available make such comparisons a difficult matter.

Given certain definite conditions as, for instance, the construction of 10 miles of 20-ft. concrete pavement having an average thickness of 8.33 in., it is a simple matter to compute that 46,834 barrels of cement, 13,992 cu. yds. of sand and 20,750 cu. yds. of stone will be required. If then the prices of the aggregates are known at the place of delivery and added to the cost of hauling them to the site where they are to be placed, the total cost of the aggregates is determined. But the cost of hauling is dependent on local conditions, such as the condition of the road, the weather, the equipment used and other factors.

Trucks Indispensable

In the matter of hauling aggregates to the mixer, the equipment used will have an important bearing on the cost of that item. Concrete road contractors, like contractors on many other classes of work involving transportation of materials, have realized the adaptability of the motor truck for such work, and under favorable conditions the use of trucks for hauling aggregates from gravel and sand pits, quarries or railway delivery points has resulted in substantial savings.

Concrete roadbuilding is not limited to the vicinity of towns and railway sidings, and transporting the aggregates for a contract sometimes as far as ten miles from a shipping point may present a serious problem. Proper hauling equipment on such a job is of vital importance, for the cost of placing the materials at the mixer may be the deciding factor in the success or failure of the contractor. Local aggregate supplies are being used in increasing amount, the materials being hauled from them to the mixer by motor truck.

Concrete roadbuilding has increased to such an extent that the aggregate supply from quarries and pits having railroad shipping facilities is becoming inadequate. With the motor truck as a means of transportation, it has been found practical and economical in many cases to install temporary aggregate plants as near to the job as suitable materials can be found, regardless of railroad facilities.

Good Roads Help

In most cases where the roads are such as to permit the use of motor trucks on concrete road construction, they have effected substantial savings. The cost of loading and unloading aggregates will be much the same for motor trucks as for dump wagons, plant conditions being similar. The condition of the roads over which the aggregates are to be hauled will limit the size of the load and the speed of the truck, and into the required number of compartments (three) so that separately measured volumes of cement, sand and coarse aggregate complete for one batch could be dumped into the hopper of the mixer.

A number of examples with cost data will illustrate the advantages of motor truck hauling under various conditions.

R. H. Gumz, paving contractor in Milwaukee, is paying $1.50 per cu. yd. for hauling concrete aggregates 8½ miles from the pit to the job. The trucks haul 5 cu. yds. to the load and usually make six trips a day. The cost of hauling aggregates this distance by team would be prohibitive, amounting to nearly twice that price, even if teams could be secured at $1 an hour.

During the construction of the Beloit-Janesville road in southern Wisconsin, the contractor paid for the delivery of aggregates as follows:

$1.10 per cu. yd. on a 3 1-3 to 4½-mile haul;

The Charges for Truck No. 1 Were:

Depreciation, 100,000 miles (truck value minus tires)	$255.16
Total wages of driver	319.74
Gasoline, 1,377 gal. at 25c	344.25
Lubricating oil, 117 gal. at 56c	65.52
Hard oil, 128.5 lb. at 6c	7.71
Waste, 20 lb. at 20c	4.00
Tire depreciation, 5,316 miles at 3c	159.48
Repairs and renewals	160.00
Total operating charges	$1,315.86
Fixed charges (interest)	288.00
	$1,603.86
Average haul in miles	5.54
Number of yards hauled	1,863.00
Total number yard miles performed, 10,321	$0.155 yd. mile
Total number ton miles performed, 15,481	0.104 ton mile

The Charges for Truck No. 2 Were:

Depreciation, 100,000 miles (truck value minus tires)	$237.40
Total wages of driver	297.00
Gasoline, 1,235 gal. at 25c	308.75
Lubricating oils, 117 gal. at 65c	68.88
Hard oils, 128.5 lb. at 6c	4.08
Waste, 21.5 lb. at 20c	4.30
Tire depreciation at 3c per mile	148.38
Repairs and renewals	131.00
Total operating charges	$1,199.79
Fixed charges (interest)	288.00
	$1,487.79
Average haul in miles	5.54
Number of yards hauled	1,780.00
Total number of yard miles performed, 9,861	$0.151 yd. mile
Total number of ton miles performed, 14,791	0.101 ton mile

Above tables show the cost of hauling aggregates on a highway job in Luce County, Michigan, under construction during the summer of 1918. Two five-ton trucks were used. The interest on truck investment was taken at six per cent per year, and no insurance was included.

will therefore determine the relative economy of motor truck or team hauling.

On a large number of concrete road jobs going on in various parts of the country this year where motor trucks have been used to transport materials, either special bodies have been built for the trucks or the regular bodies divided

$1.00 per cu. yd. on a 3 to 3½-mile haul, and

$.90 per cu. yd. on a 2 to 3-mile haul.

The Atwood-Davis Land & Gravel Co., from whom the aggregates were bought, delivered them on the job for the above prices, using three trucks, two trucks hauling 40 cu. yds. per day and one truck hauling 24 cu. yds. per day.

The cost of hauling aggregates by motor truck for the construction of a one-course concrete road in Allen County, Ind., was $.011 per sq. yd. of pavement. The hauling was done with 3 and 4-ton trucks, the average length of haul being 1.7 miles. The materials were loaded mechanically at a cost of approximately 9 cents per cu. yd., the actual cost of hauling being 42 cents per cu. yd.

A saving of about $1000 per mile was effected by Itasca County, Minn., by using motor trucks instead of teams for hauling materials on the construction of the Grand Rapids-Duluth highway in the fall of 1918. Two motor trucks of 5 cu. yd. capacity and three of 3 cu. yd. capacity were used. Figuring in all expenses for operation of trucks and including depreciation and interest, garage charges, repairs and overhauling on completion of the work, it was found that the cost of hauling was $1.15 per yd., the average hauling being 3 miles. If the hauling had been done by teams, the cost would have been very near to $2 per cu. yd. and the cost of the road would have been increased by $1000 per mile.

During the construction of the Belair road of the Maryland State Highway Commission in the spring of 1919, wet concrete was delivered from a central crushing and mixing plant to the road surface by motor truck over hauls ranging from ¼ to 4 miles. Extensive rehandling of materials was thus dispensed with and the cost of the work reduced. In spite of the length of the haul, there was no apparent injury to the quality of the concrete mixture. As there was excellent stone in the hills adjacent to the road, a location was selected about midway on the contract, a quarry opened and a crushing and mixing plant installed. A 3-ft. strip of concrete, 8 in. thick, was built on each side of the macadam road. The mixed concrete was dumped from the trucks upon the surface of the old road and shoveled into the forms at the side. Forty cu. yds. of concrete were placed per day, the average cost of hauling being $1.76 per cu. yd.

In the work of building highways, as in other work requiring the transportation of large quantities of materials to locations not served by railways, the motor truck has brought a more efficient and economical means of transportation.

Motor Bus Lines Are a Very Profitable Field for Truck Dealers

Experience of a Boston Dealer Who Has Successfully Merchandised Motor Buses. Traveling Public Likes to Ride in Buses in Preference to Street Cars and Railways

By C. P. SHATTUCK

FEW, indeed, are the street railways supplying transportation at the old rate of a nickel a ride. Increase in fares is noticeable throughout the country, the amounts varying from a penny to five cents extra fares, which the railways say they must have or be obliged to discontinue service. But despite the fact that it knows the railways are paying higher wages to its employees, that the cost of maintaining equipment is higher, and that the materials entering into service have advanced in price, the public does not take kindly to the increased fares, and, to show its disapproval of the railways, it is patronizing motor 'buses.

The enormous increase in the use of motor 'buses is not confined alone to the large cities and towns, but prevails in the smaller communities, where the 'buses are taking a large share of the steam roads' patronage. There is hardly a town of note in New England that does not have one or more 'bus lines in competition with the steam road. The curtailment of rail service, elimination of trains, has afforded the 'bus operator an opportunity he has not been slow to grasp, and in many of the hotels will be found cards containing the schedule of 'buses operating to adjoining towns, many of which are several miles distant. Commercial travellers are patronizing these lines, for the service is far superior to the steam road. And these 'buses are filling a long-felt want in interurban service, providing as they do transportation over routes not served by the common carriers.

Reference is not made to the jitney, large numbers of which operate in many cities of the East. There is a big difference between the jitney and the motor 'bus. The former is any old type of automobile, generally a Ford, and is owned and operated by an irresponsible class. The motor 'bus is a truck chassis, with a capacity ranging from 1500 lb. to 1½ tons, equipped with a high grade of body with well appointed seats, electric lighting, etc., and is operated by companies backed by responsible people; in fact, there is in the process of formation, a number of companies which propose to operate fleets ranging from 15 to 50 motor 'buses.

One of the Several Buses Replacing Cross-Town Lines Discontinued in New York City.

One of the Motor Buses in Service Between Newark and Elizabeth, N. J. There Are Four Hundred and Eight Buses Operating in and Around Newark

Boston Dealer Merchandising Buses

One of the most successful dealers engaged in merchandising motor 'buses is the Intercontinental Truck Corp., Boston, Mass., New England distributor for the Day-Elder line. This con-

cern through its 'bus salesman, S. S. Young, made a very careful analysis of passenger transportation, beginning its investigation at the time the Boston street railways began to advance its fares. After considerable time had been spent, and figures delved into, it was evident that the street railways could not resume operation on a five cent fare a fare of five cents per person. The company took over a body building plant and designed a special body. It is of the panel type, has cane seated chairs, five windows on each side, electric lighting and starting, and many are of the pre-payment type.

The chassis is a special Day-Elder, 1½-tons capacity, and the springs on

Standard Type of Body Mounted on Day-Elder Chassis

Electric lighting and starting is furnished by the Intercontinental Truck Corporation, Boston, which company is specializing in motor bus merchandising

basis, for the reasons mentioned in the beginning of this article.

Investigation proved that hundreds of thousands of people in Boston, Lynn, Salem, Peabody, etc., who rode what may be termed short distances, a mile or less, strenuously objected to paying the maximum fare of 10 cents for a minimum ride. The writer believes he is correct when he states that the short haul is where the railways make their money; that the frequent selling of the same seat during the trip is highly profitable, whereas the maximum ride is not.

Threaten to Discontinue Service

The street railways threatened to discontinue their service, it is said, and it is further hinted that in some instances the town fathers were approached and asked to contribute to the support of the lines. The street car line strikes supplied additional evidence that the public would support a properly operated motor 'bus service, and these with other similar factors led the Intercontinental Motor Corp. to plan an extensive sales campaign in merchandising motor 'buses and service.

Design Special Body

Comprehensive data was compiled on passenger transportation by motor 'buses and it was figured that a 1½-ton chassis with a 20 to 24-seat capacity body could be profitably operated where the haul did not exceed three miles at the right side are made heavier. Other special features include a Brown and Lipe wet type of disc clutch, a Covert transmission, and a final gear ratio of 7:1. The 'bus is said to be capable of averaging from 28 to 30 m.p.h. Firestone cords, 35 x 4 in. front and 38 x 7 in rear, are used. The seats are removable, facilitating cleaning, and the finish throughout is very attractive. Registers are used on some.

The Intercontinental Truck Corp. has placed a large number of these 'buses in service, and the business has increased so rapidly that arrangements are in progress to take over another body factory, as the company proposes to merchandise bodies as soon as production warrants. The 'buses are not sold to a prospect until the salesman makes a thorough investigation of the territory to be served. Mr. Young goes over the territory with the prospect, ascertains the mileage, condition of the road, population of the territory served, possibilities of developing business, how many times it will be possible to resell a seat, and he also visits the town fathers, enlisting their aid. If the territory will support a 'bus or more than one, the prospect is advised to invest. If not the prospect is so told, and an effort made to establish a line in a more favorable locality.

On taking over the 'bus the prospect is given the experience of the company in operating a 'bus line, and from time time the operator is guided. Inasmuch as the company has a large number of owners in the 'bus business it has accumulated considerable practical as well as valuable information.

Paid for in Two Months

In speaking of the possibilities of the motor 'bus Mr. Young said that they can and are operated at a profit at a five cent fare with a maximum distance of three miles. He said they are largely sold on the time payment plan and that many anticipate their payments. One operator paid up completely in two months by operating the 'bus 24 hours and using three shifts of drivers. In many instances the 'buses are in service 18 hours a day and some operate continuously. The mileages rolled up vary. Some average 600 miles the week while others make 1000, it depending upon the service. Mr. Young says costs are not maintained by the owners, and that they figure to charge off the truck in two years owing to the severe service and the number of starts and stops.

Motor 'bus operators require a more highly specialized service than do the average truck owner. The company gives night and day service, and should

Pre-payment Type of Bus Operated by the Massachusetts Omnibus Corporation.

a 'bus break down on the road another is supplied while the repairs are being effected. Ordinary repairs are made on the spot by a service road man.

Mr. Young states that the 'buses can be operated at a cost of $15 the day of 18 hours and with a mileage of 3000 the month. The costs include insurance, depreciation, repairs, fuel, oil, driver, tires, parts, etc., but not garage, as the cars are on the road practically all the time.

All of the 'buses sold by the company are not operating on a five-cent fare basis. A line between Dalton and Pittsfield, 4 miles, sells its seats for ten cents, as do lines operating between Whitman and Brockton. The statement is made that a corporation in Boston is planning to start a fleet of 45 and that six are to be placed in service at Providence, R. I. If they prove successful in the last named city the promoters will place 50 in service by the first of the year. In every instance a careful investigation is made of the conditions under which the 'buses are to operate and the analysis also includes obtaining the co-operation of the town or city officials.

There has been an enormous growth in the use of motor 'buses in Newark, N. J., since 1916, as is evident by figures supplied the superintendent of traffic who has charge of these vehicles. In 1916 the average number was 155, and this increased to 190 the following year. In 1918 there were 225 'buses, and in September, 1919, there were 408 in service. Newark is sold on the idea of motor 'buses and the machines are always crowded. The popularity of the 'buses is largely due to the unpopularity of the street railways and the attempt to force a zone system on the public. This had not, at the time this article was written, worked out satisfactorily, particularly to the short distance rider.

Applicants for a license to operate a motor 'bus are obliged to pass an examination, vehicular, as to their ability. They supply a bond and are assigned a route from which they cannot deviate. The motor 'buses operate to adjoining towns, and while these towns have control they co-operate with Newark in the matter of routes, schedules, etc. Insofar as could be ascertained none of the operators keep costs, but those with whom the writer talked stated that they were making money, particularly since the public deserted the street cars. Each 'bus carries a register supplied by the city and every 'bus pays five per cent. gross of its receipts as a tax. That these 'buses carried a few passengers in 1918 is evident from the statement that they paid in $34,000, five per cent. of $680,000. The fare in Newark is five cents.

Increase of Buses in New York

An example of the possibility of motor 'bus operation is the Fifth Avenue Coach Company, New York City, whose 'buses are a familiar sight on Fifth Avenue and Riverside Drive. This company began operation in 1909, at which time it had 61 'buses in service, and the Public Service Commission report states that the cars transported 3,609,304 passengers and that the passenger revenue was $351,609.90. The report in 1916 says: "The stage coach traffic continued to show a high rate of increase, namely, 15.46 per cent., which is more than three times that for the street railways of the city as a whole (5.04) and more than five times that for the Manhattan surface roads (2.85), in which borough the company operates. As the rate of fare is double that of the street railways, it would appear that this somewhat comfortable means of transit fills a distinct need." The increase, 1916 over 1911, in 'buses was 65 per cent.; 'bus mile, active and idle, 266.73, and passenger revenue, 170.50.

The annual report filed for the year ending June 30, 1917, is of interest to prospective operators of 'buses in large numbers and is shown in the accompanying tables:

			1917		Year's increase or (d) decrease
Number of 'buses (exclusive of 35 non-revenue 'buses)			176		44
Number of round trips made during year			434,250		11,040
Number of 'bus hours during year			718,050		132,761
Number of 'bus miles (including 64,475 "idle" miles)			5,843,052		876,057
Number of passengers carried, at 10c			22,080,764		5,857,722
	Per 'bus mile* (cents)				
Total amount of fares (38.21c per active 'bus mile)	37.69		$2,208,076.40		$585,772.20
Revenue from livery service (15,631 'bus miles)	.22		13,061.02	d	3,220.64
Advertising privileges	.39		22,679.06	d	8,461.26
Total revenue from operation	38.30		$2,243,816.48		$574,090.30
Maintenance:					
Superintendence, $41,402.69; shop expenses, $11,596.79	.91		$52,999.48		$18,934.87
Repairs (omnibus bodies and chassis, $195,833.85)	3.50		205,512.35		85,157.20
Tires (a)	.79		46,386.57	d	8,146.06
Depreciation	1.25	(b)	73,180.96	d	20,427.21
Conducting transportation	15.32		897,291.68		298,395.65
Accidents and damages	1.22	(c)	71,270.27		18,591.79
Traffic—advertising	.49		28,487.88		5,573.34
General and miscellaneous	1.41		82,805.50		15,164.75
Total operating expenses	24.89		$1,457,934.69		$393,244.33
Taxes	2.79	(d)	163,373.74		58,107.19
Total revenue deductions	27.63		$1,621,308.43		$451,351.32
Income from operation	10.62		$622,508.05		$122,738.78
Non-operating income		(e)	19,735.69	(f)	D 3,432.27
Gross income applicable to corporate and leased properties			$642,243.74		$119,306.51
Income deductions—garage rent, $57,291.67, and proportionate cost of improvements, $2,016.38			59,708.05	d	20,232.52
Net income for year			$582,535.69		$139,539.03
Surplus adjustments—balance		(g)	Dr. 13,806.54		24,939.11
Net increase in corporate surplus			$568,729.15		$114,599.92

Employees—Last payroll of June, 1917; conductors, 360; drivers, 334; others, 373; total, 1,067. Total salaries and wages, $882,901.61 (inclusive of officers, $49,288.29); increase over 1916, $246,016.17.

Accidents—Killed, 5; injured, 27.

* Based on 5,858,683 miles (including 15,631 private hire miles).

(a) Reported as depreciation of tires. Based on 'bus-tire mileage at the guaranteed tire cost per mile, credit being made for tires which exceed the guaranteed mileage and for scrap. (See balance-sheet item, guaranteed cost of tires in service).

(b) Consists of three items: Depreciation of shop tools and machinery, $4,497.67; depreciation of buildings, $861.48, and depreciation of equipment, $67,821.81. The last amount is the balance between total estimated maintenance of $378,079.36, based on 5,907,490 'bus miles (including 15,631 private hire and 48,807 non-revenue miles), at 6.4c per mile, less the sum of all other maintenance charges, $310,-$257.55.

The abandonment of some of the cross lines in New York has led to the utilization of motor 'buses, which are operating under a license from the city and at a five-cent fare. In other sections of Greater New York efforts are being made to establish motor 'bus service to supply five cent fares to the public. In practically every instance individual drivers are giving service, although it was believed at one time that a company would be formed to operate a fleet. There is no doubt but what there is an

opportunity to operate 'buses in a responsible manner in those sections in New York not served efficiently by the common carriers, but it will require an organization capable of meeting the scale and serving a considerable territory. If this be true, and indications point that way, the progressive truck dealer will familiarize himself with conditions obtaining with motor 'bus service and exploit this most profitable field. If it be true that a motor 'bus can be profitably operated at a five cent fare, there are thousands of opportunities awaiting the dealer who can merchandise passenger transportation.

varying requirements of this particular service.

Will the motor 'bus supplant many of the street railways? Many students of transportation predict that they will in many sections of the country, particularly where the 10 cent fare prevails for short distances. Some even go so far as to state that capital is beginning to become interested in the possibilities of establishing motor 'bus lines on a large

Balance Sheet

	June 30 1916		June 30 1917		Year's increase or decrease
Assest Side					
Cash	$112,282.97		$204,011.69		$91,728.72
Bills receivable	885.80		.....		885.80
Accounts receivable	25,996.54		23,899.42		2,097.12
Interest and dividends receivable	1,666.01		6,134.28		4,468.27
Materials and supplies	108,579.63		174,833.97		66,254.34
Total floating capital	$249,410.95		$408,879.36		$159,468.41
Motor 'buses	$684,077.46		$800,912.27		$116,834.81
Shop and miscellaneous equipment	52,315.26		92,453.37		40,138.11
Office furniture and fixtures	6,169.63		7,192.63		1,023.00
Organization	25,105.27		25,105.27		.....
Real estate	69,025.41		69,025.41		.....
Shops and car-houses (garage)	43,074.47		43,074.47		.....
Total fixed capital—gross	$879,767.50		$1,037,763.42		$157,995.92
Accrued amortization of capital—Cr.	442,882.00	(h)	478,185.33		35,303.33
Total fixed capital—net	$436,885.50		$559,578.09		$122,692.59
Miscellaneous investments	$300,302.03		$619,730.18		$319,428.15
Construction in process (motor 'buses)	48,026.04		23,090.89	D	24,935.15
Prepayments	9,577.55		15,770.55		6,193.00
Suspense (new franchises, etc.)	93,578.37		150,018.27		56,439.90
Guaranteed cost of tires in service (see note a)	5,532.17		8,406.98		2,874.81
Total—assets side	$1,143,312.61		$1,785,474.32		$642,161.71
Liabilities Side					
Taxes accrued	$71,625.57		$113,807.16		$42,181.59
Miscellaneous accounts payable	74,428.24		111,305.32		36,877.08
Reserve for injury and damage (claims)	234,167.39		223,132.44	D	11,034.95
Other reserves	6,996.90	(i)	12,405.74		5,408.84
Capital stock	50,000.00		50,000.00		.....
Corporate surplus	706,094.51		1,274,823.66		568,729.15
Total—liabilities side	$1,143,312.61		$1,785,474.32		$642,161.71

(c) Represents amount expended in settlement of claims, $62,166.03—less excess of actual payments charged to the reserve over the accruals during the year credited to reserve, $11,034.95; claim department and other expenses, $20,139.19. Credits to reserve provide only for the actual payment of claims (excluding expenses in connection therewith) and were made on the basis of ¾ of a cent per 'bus mile from July 1, 1916, to January 31, 1917, and at the rate of 1 cent per 'bus mile from February 1 to June 30, 1917. Number of suits for damages pending June 30, 1916, 62; brought during the year, 125; disposed of during the year, 96; pending June 30, 1917, 91.

(d) Includes $2,000 for franchise, account of temporary extension to 168th Street.

(e) Rent, $9,479.79; interest on deposits, $3,635.60; interest on investments, $18,810.66; total, $31,926.05; less non-operating revenue deductions, $12,190.36; net, $19,735.69.

(f) Profit on sale of investment securities, $15,676.24, included in non-operating income in 1916 (transferred to surplus).

(g) Debits—Balance of unamortized cost of equipment retired during year, $4,253.08; radiators scrapped, $211.75; bad debts written off, $5,177.99; adjustment of federal income tax, $2,125.85; depreciation on buildings, July 1, 1911, to June 30, 1916, $4,269.82; other items, $2,851.26; total, $18,889.75. Credits—bad debts collected, $162.49; profit on sale of $75,000 City of New York Water Supply Bonds, $2,675; profit on sale of equipment, $1,241.66 other adjustments, $1,004.06; total, $5,083.21. Net debit, $13,806.54.

(h) Depreciation of equipment, $454,468.65; shop, tools, etc., $18,585.98; buildings, $5,131.30.

(i) Reserve for depreciation of uniforms, $3,268.05; reserve for reconstruction of 88th Street garage, $8,289.79; reserve for improvement to leasehold property—4 to 20 E. 102nd Street, $847.90.

Armleder Motor Sales Co., 1105 Cathedral Street, Baltimore, Md., has changed its name to the Seabird Sales & Service Co.

A. G. M. A. Further Standardization

The American Gear Manufacturers' Association at their semi-annual meeting, held at Boston, October 13 to 16, made big strides toward the point of complete gear standardization. Below is an abridged outline of the results of the conference along these lines.

Recommended Practices for Composition Gearing, Gears and Pinions for Electric Railway Service, and Bevel Gearing were prepared and proposed for adoption at this meeting.

In the case of Composition Gearing, this was accepted in its entirety, except one sentence as to horsepower, which was dropped out for the time being.

In the case of Gears and Pinions for Electric Railway Service, this was accepted in its entirety as Recommended Practice if certain additions such as drawings are furnished, which the committee will proceed to furnish.

In the case of Bevel Gearing, Section 1 was referred back to the committee. Sections 2, 3 and 4 were accepted as Recommended Practice. Table 3 was referred back to the committee.

There was also submitted by the Special Committee on Limits for Holes, a Recommended Practice for Holes, and this was accepted as Recommended Practice.

The Sprocket Commitee made a very interesting report that will be printed and submitted to the membership. No action beyond the permission to print it was taken.

Dealers' Association Aids in Strike

BOSTON, MASS., Oct. 16.—The Boston Automobile Dealers' Association offered valuable service during the recent strike of policemen. It volunteered over 100 trucks and drivers to bring in troops and state guards from the outlying districts. It organized a traffic squad of from 85 to 100 men from the ranks of the salesmen. It supplied police and military authorities with 45 cars each day for transportation.

It had 175 chauffeurs, 42 inspectors and 250 cars ready for use in case the firemen should carry out their threat to carry on a sympathy strike. It bought outright from the funds of the association 14 cars which it gave to the military authorities so that they might maintain a twenty-four hour service. Great credit is due this association for the hearty co-operation and assistance it rendered in bringing the strike to an end.

Record Sales Made

CAMP HOLABIRD, MD., Oct. 28.—All records were smashed at the seventh weekly sale of motor vehicles held here on October 23. At this sale 222 unserviceable army vehicles, including Dodge touring cars and Hurlburt, White, Selden, Peerless and Gramm-Bernstein trucks, were disposed of for $122,000.

Employ Only Competent Drivers to Reduce Truck Operation Costs

By WARREN EUGENE CRANE

THE cost of running motor trucks is a variable item. There are three elements that enter into their operation: First, mode of driving; second, condition of roads, and third, atmospheric conditions. When one has considered these factors and recognized their inconsistency, he can then proceed to a survey of the tangible things that go to make up the cost of running a truck. They are the tires, gasoline, lubricating oil, grease, tires, labor, insurance, storage, interest on money invested, depreciation and repairs. These are the items of expense that every truck owner must meet. If he would take particular pains to choose reliable drivers who use commendable care in the operation and care of his machines he will have taken a long step toward the reduction of his costs.

Figures Daily Expense

The Motor Freight Terminal Company, which operates fifteen trucks, is one of the largest rural motor-express firms operating trucks out of Seattle. It covers a majority of the towns and cities within a radius of forty miles of the city, and its trips are over roads that are nearly impossible in some cases and excellent in others. According to A. C. Smith, secretary and treasurer, their average daily expense for a 2½-ton truck is as follows:

12 gal. gasoline at 22½c	$2.70
Tires	3.00
Labor (including overtime)	10.00
Insurance	1.00
Storage	.40
Depreciation	3.00
Oil and Grease	.75
Repairs	2.00
Total	$22.85

One item that varies greatly in Mr. Smith's opinion is the oil and grease. This varies proportionately to the carefulness of the driver in driving his machine.

The Service Auto Freight Terminal Co. operates motor express lines between Seattle, Everett and surrounding cities. Their average daily operation expense for their Garford two-ton truck has been as follows:

15 gal. gasoline at 22c	$3.30
Repairs	.07
Oil	.30
Tires	3.30
Insurance	.50
Storage	.20
Labor	5.50
Depreciation	2.50
Total	$15.67

The company reports that the foregoing figures are based on an average daily mileage of ninety-five miles. They also operate a light Ford delivery car for the delivery of light packages around the city at a cost of seven dollars a day.

The Seattle Auto Freight Co., a co-operative motor express firm, operates trucks from Seattle to Kent, Auburn, Issaquah, Tolt, Stillwater, Carnation, Bothell, Kirkland, Renton, Sumner, Snohomish, Taylor, O'Brien, Ballard and other towns within a 45-mile radius of their headquarters. Each member pays a pro-rata of the expense of maintenance of depots, rent, light, heat, telephone, as well as the salaries of the manager, bookkeeper and floor-men. Their average daily expense for a two-ton truck with a driver and helper on a forty-five mile drive is as follows:

Gasoline	$4.50
Depreciation	2.66
Tires	2.00
Repairs	1.32
Oil and Grease	.90
Insurance	.38
Interest on Investment	.65
License	.08
Driver's Salary	5.00
Helper's Salary	4.50
Total	$21.99

The Globe Milling & Grain Co., of Seattle, operates one 3½-ton Standard truck and one 3½-ton Garford truck to haul grain to dairymen within a radius of ten miles of their warehouse, at an average cost of 87 cents per ton. Their average cost per day for their 3½-ton machine is $15. These figures include the salary of the driver and depreciation during the first year of 20 per cent. and each year thereafter.

Variance in Costs Governed by Conditions

Galbraith & Co., produce and grain merchants, operate five 4-ton Packard trucks and a Ford service car in hauling their products in Seattle, as well as from the Yakima Indian Reservation to Ellensburg. They report that their operation costs vary from fifty cents a ton under favorable conditions with good roads and careful drivers to $1 a ton under bad conditions.

The big lumber companies of the Northwest have found that it costs 95 cents per thousand ft. to haul timber with motor trucks and trailers as compared with $2.75 per thousand with narrow gauge railroads and $3.50 per thousand with horses.

A 3½-ton Federal truck in conjunction with a 3½-ton trailer has been in use near Raymond, Wash., hauling timber. The operating cost, including gasoline, tires, depreciation, oil, grease, insurance, taxes, interest on money, wages of drivers, repairs and upkeep average $20 per day.

F. J. Fitzpatrick, of the Pacific Power & Foundry Co., manufacturers of the Universal Trailer, states that logs can be hauled for as low as ninety cents per thousand if the drivers and helpers understand their work. He claims, however, that if amateurs who are inexperienced in logging operations are employed, the cost can run up to $2.90 per thousand.

Truck a Money Saver

A five and a half ton Mack truck with an eight and a half ton trailer near Mt. Vernon, Washington, carried what is said to be the largest log ever hauled on a motor truck. It contained 7809 ft. of timber. The operation of an outfit of this kind, including all fixed and variable expenses such as depreciation, interest on money, labor, insurance, tires, gasoline, license, oil, grease, average a little over twenty-five dollars a day. The Seattle coal dealers have found the motor truck a great assistance in building up business, as well as a money saver when compared with the horse. The Will Blair Fuel Yards operate one two-ton Mack and two Sterling trucks of two and one-half tons and three tons capacity, respectively. They have kept a careful account of their teams and have found their average monthly expense to be as follows: Feed and barn, $75; shoeing, $8; repairs and harness, $2; total, $85. They claim that they have found that the motor truck saves a great deal of time and makes it possible for them to deliver coal in an increased territory and at a lower rate of expense per ton than the horse.

The Keating Fuel Co. has replaced three teams and from two to three men by the use of a Kleiber two-ton truck. They state that they have found from their experience that it is advisable to pay more than the usual wage scale in order to get drivers who will drive carefully. Their average daily expense for their two-ton trucks is as follows:

Gasoline	$1.00
Oil and Grease	.20
Tires	1.00
Driver's Salary	5.25
Helper's Salary (50 cts. an hr.)	4.00
Insurance (fire, liability and theft)	.65
Depreciation at 20% per year	1.49
Interest on Money at 7%	.51
Total	$14.10

The City Fuel Co. operate two machines and claim that two of their machines have replaced six horses and are doing twice the work that they used to perform. They state that it costs $12.50 to $15 to operate a truck, including salary of driver, depreciation at 20 per cent., oil, repairs, and gasoline.

Wainwright & McLeod, prominent fuel dealers, operate two 2-ton Garford trucks and one 2½-ton Gersix. They claim that they have displaced thirteen horses with these machines. Mr. A. D.

Wainwright, of the company, states that their average daily fixed and variable cost per day is as follows:

Gasoline	$1.10
Oil and Grease	.14
Tires	1.15
Labor	5.00
Insurance	.24
Depreciation	1.50
Repairs	1.45
Interest on Money	.53
Total	$11.11

They claim that the only place that they find the horse profitable is for hauls on unpaved streets in winter when the mud is deep.

Milligan & Nesbitt, Seattle fuel dealers, operate one 2-ton Acme and one 1½-ton Northwestern truck with an average cost of 13 cents per mile. Their average daily operating cost is as follows:

Labor	$4.75
Gasoline	1.20
Tires	1.25
Depreciation	1.31
Oil	.15
Interest	.46
Repairs	1.50
Garage Rent	.20
Total	$10.82

They state that they have found that the motor truck enables them to cover four times as much ground as horses and has resulted in a big increase in their business.

Henry Heckman, a coal dealer, operates one 2-ton Garford truck and two 2½-ton Northwestern trucks. His machines cost him an average of $12 per day, including labor, depreciation, tires, gasoline, insurance, oil, grease, repairs, and storage. He claims that his cost per ton on paved streets is far lower than for horses.

The Continental Fuel Co. operates one 2-ton Sterling truck and one 2-ton truck with an attachment. Mr. James R. Hayden, the manager, claims that their average daily operating expense, including all expenditures for tires, gasoline, insurance, repairs, interest on money, labor of driver, storage, and depreciation, is $12.

The consensus of opinion of dealers in various lines of business is that the motor truck, if carefully and competently operated, is the most efficient and economical form of transportation.

Estimates Operating Costs of Truck, Exclusive of Driver, at $4.90 a Day

DANIEL FOELL, with a single two-ton Model 12 Republic truck, conducts the North-Eastern Express in Philadelphia, covering the suburban industrial sections of Frankford, Bridesburg, Richmond and Kensington. He rents a garage for the storage of his vehicle, but his headquarters proper is a combination receiving station and clearing house for numerous express companies at 220 Market St. This provides a central location in the wholesale district, and as Foell's chief business is hauling from wholesaler's warehouse to retailer, the arrangement is a convenient one and the fee is a matter of about $3 a week.

From this central point Foell runs in a radius that does not exceed six miles, under ordinary circumstances his truck averaging between twenty-five and thirty miles daily. He keeps his customers and a few of these, by virtue of having been on his list since he started, enjoy the rate which he made them at the time —twenty cents per ordinary package, meaning by that, a package that is not extraordinarily bulky, heavy, or odd and vehicle-filling as to shape. Owing to the varied nature of the merchandise Foell hauls, his rates also have to be variable. For the usual package of such goods as women's wear, coffee, toys, or carpet in small lots, the charge may run from twenty-five cents upward. Such merchandise as a barrel of oil containing less than 500 lb., will bring a charge of $1 and more than that quantity, $1.25.

For especially awkward, or odd-shaped merchandise, he has charged as high as $3 and $4 per package. His usual charge for a case about the size of a milliner's packing box for a dozen samples, is $1.

He has no iron-bound rate schedule according to package size and weight, establishing his rates rather according to the inconvenience of handling. But he has two rules to which he strictly adheres.

He will move no household goods from one dwelling to another.

He will not call for goods where there is no elevator service and the goods are on a floor above the second story. As he works as a driver himself, with a single helper, this he considers a good and economical brace of rules to observe, as he is saving his strength for worth-while jobs that he can handle with facility.

Discards Horse

Foell first started in the expressing business with two single-horse delivery wagons and a one-ton Republic truck. He found that he could use the truck to good enough advantage to get rid of one horse and wagon, but his business grew so that, in December of 1917, he found it wise to purchase a larger truck and trade in his small motor car, abandoning the surviving horse-drawn vehicle. On Dec. 11 of that year he bought the truck he is now using, paying $1885 for the chassis and a freight bill of $60 for its delivery. Then he had made to order a covered express body, the sides and rear also being protected with tarpaulins. This body cost him $377.

Foell doesn't balance his books till the end of his year. This is how he has entered his cost:

Dec. 11, 1917, cost of chassis	$1885.00
Freight	60.00
War tax (agency paid half)	28.28
Insurance	83.00
Express body, covered, made to order	377.00
Complete cost of truck, ready for work	2433.28
Cost of operation, from Dec. 11, 1917, to Dec. 31, 1918, working 310 actual days, including license, garage rent of $15 a month, oil, grease and gasoline	786.86
Spent on truck, including fixed charges, original cost, etc.	3220.14

While he kept his accounts closely, Foell has lumped them as to the items of gasoline, oil and grease.

He pays his help $4 a day. He roughly estimates his operating cost, not including his own services as driver and superintendent, at $4.90 for every day the truck worked. He estimates that within the period mentioned, the truck depreciated to the extent of $740. For the first six months of continuous work with the car, he spent only about $19 in minor repairs and in the first nineteen months he lost only one working day through the truck's disability.

However, while at the receiving station the truck was rammed by a trolley car and damaged to the extent of $178. He received $25 for this from the insurance company. The truck was not so badly injured as to interfere with the actual work of the day, but Foell considers that the damage greatly accelerated the depreciation in actual value of the machine. He figured off $153 as loss on the investment through the mishap.

Foell received an offer of $1700 on a trade-in, but did not accept. The truck value in this instance was taken from the amount of insurance offered to cover it. Foell estimates that, with his help's wages added, the truck costs him about $2526 a year to operate.

Tires purchased Dec. 10, 1918, lasted until March 3 of the present year. This was the first new set of tires purchased for the machine since Foell received it by freight.

At first Foell had a driver as well as a helper, but drivers all over the city at the time were having such bad luck with thefts from their loads and tipovers that Foell thought it would be the part of wisdom to play driver and superintendent at the same time.

The return-load system has not worked out as satisfactorily for him as he could wish, owing to the nature of his business. He rarely gets a return load

partly owing to the diversified route and the comparatively short route traversed.

Seventy per cent. of the goods loaded, which is usually from 5 to 6 p. m. at the receiving station in Market St., is hauled into the garage for delivery next day. Then comes the "clean-up" on deliveries in the morning, Foell going to Frankford, making stops along the route and after leaving Frankford, cutting over into Bridesburg, thence to Richmond and on into what is known as the "old Kensington district."

Foell has no wharf or terminal hauls and refrains from hiring his truck for picnic purposes—a favorite dull season "sport" in Philadelphia during fine weather.

City Grocer Maintains Cost Record of Delivery Expenditures

George S. Price conducts a general grocery store with a meat department at Eighteenth and Ontario Sts., Philadelphia. This is the story of how he has saved time and money by purchasing a motor truck and getting rid of a hired team.

The team had to haul his stock from the city wharves and this necessitated his getting up at one o'clock in the morning. He was almost never able to return to the store before 7 a. m., partly because of long waits in line added to the time it took his team to jog to the wharves and back. Slow deliveries don't make satisfied customers and Price began to think hard. The end of the matter was that he decided to stop hiring the team and buy a light delivery car. A half-ton Vim caught his fancy, costing, with a year's insurance, about $1000. He employs one driver, in addition to his five clerks.

No solicitors are employed outside by Mr. Price and he still attends to that wharf trip, but instead of its taking him from one till seven a. m., he now makes it in two hours.

As soon as he returns to the store from the wharf, he solicits orders over the telephone and while he is thus engaged, a helper in the store is gathering up for delivery what is to go out on the telephoned orders.

Then, when Mr. Price has finished telephoning, he helps his employee stack up and load on the car the last few orders before the car is scheduled to start, which is 9 a. m. The car makes three delivery trips daily. As soon as it has left, Mr. Price begins telephoning again to get orders, helping about the store and waiting on customers as soon as he leaves the 'phone, as before. When the packages have been assorted and piled up and the car has returned from its first trip, reloading is begun, deliveries this time being made in Germantown, or in the opposite direction from the first run.

From 11 to 12 o'clock the driver looks his car over, so if anything should need fixing it can be adjusted, provided it is a minor repair; but if something more serious, entailing a trip to a repair shop this can be done at this time instead of waiting until later when all the service stations or repair shops in the vicinity have closed. Although this as yet never has occurred, it would be particularly inconvenient on Saturday.

After one p. m. the driver is able to help about the store. A small schoolboy at a small wage attends to bread order deliveries in the immediate neighborhood. As soon as the driver has helped all he can and the packages for new orders have been assorted he starts out with the car on the third trip, returning in time to help with the late rush.

Thus far the repairs on Mr. Price's delivery car have been negligible. As for tires, Goodyear 31 x 4 non-skid models are used, one set lasting about a year. Mr. Price purchases his lubricating oil at the rate of 43 cts. a gal. and uses about 30 gal. a year. Gasoline, bought in quantity, costs him about 27 cts. a gal., while cup grease consumption is nominal, a five-pound can lasting indefinitely.

The three delivery routes cover about 20 mi. daily. The wharf round trip haul, including stop at the abattoir, averages 11 to 15 mi. and consumes only a single gallon of gasoline, the trip being made 300 days in the year.

Comparative yearly costs—that's the way Mr. Price keeps costs—for the wharf haul are summed up as follows:

Vim Truck

300 gal. gasoline @ 27 cts. a gal.	$ 81
Interest on investment @ 6% (including insurance)	180
Miscellaneous allowance (oil, punctures, etc.)	100
	$361

Former Hired Team

Minimum team hire @ $10 weekly, 52 weeks	$520
Yearly cost of team for wharf haul	$520
Yearly cost of truck for wharf haul	361
Yearly saving by motorization (plus time)	$159

A. J. Stephens Rubber Co., Kansas City, Mo., has increased its capital stock to $1,500,000. They contemplate adding cord and fabric tires, as well as tubes, to their present line which makes an addition to their manufacturing facilities necessary.

Statement of the Ownership, Management Circulation, Etc.

Required by the Act of Congress of August 24, 1912

Of Commercial Car Journal, published monthly at Philadelphia, Pa., for October 1st, 1919.

State of Pennsylvania,
County of Philadelphia, ss.:

Before me, a Notary Public, in and for the State and County aforesaid, personally appeared James Artman, who, having been duly sworn according to law, deposes and says that he is the Editor of the COMMERCIAL CAR JOURNAL, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business manager are:
   Publisher, CHILTON COMPANY, 49th and Market Streets, Philadelphia, Pa.
   Editor, James Artman, Narberth, Pa.
   Directing Editor, E. S. Foljambe, Drexel Hill, Pa.
   Business Manager, C. A. Musselman, 4203 Pine St., Philadelphia, Pa.
   Managing Editor, Albert G. Metz, South Ardmore, Pa.
2. That the owners are:
   James Artman, Narberth, Pa.
   George H. Buzby, Wellington Apartments, 19th and Walnut Streets, Philadelphia, Pa.
   C. A. Musselman, 4203 Pine Street, Philadelphia, Pa.
   A. H. Vaux, Gwynedd Valley, Pa.
3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent. or more of total amount of bonds, mortgages, or other securities are: None.
4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also, that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner: and that this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than as so stated by him.

JAMES ARTMAN, Editor.

Sworn and subscribed before me this 23rd day of September, 1919.

(Seal) GEORGE H. SHEVLIN.

(My commission expires April 1, 1921.)

Universal License

WASHINGTON, D. C., Oct. 28.—A bill, providing that an automobile which has been licensed in one state will not be compelled to pay a license in any other state, no matter how long its length of stay, has been introduced into the national Senate by Senator Pitman. Universal licenses has been one of the goals of automobile organizations for a long time and it seems as if this were a move in the right direction. **Do your part to boost it along!**

The California Automobile Trade Association is collecting data and statistics from all automobile trade associations in the United States. This is being done in the hope that eventually a national association may be effected.

EDITORIALS

When Dealer Organizations Lose Their Grip

MANY dealer organizations are formed with the idea of promoting good fellowship and better business principles in their respective localities. These organizations start out with the best of intentions, usually holding monthly meetings, in which trade policies are discussed and the dealers are gradually welded into closer relationship with each other, with the objects in view of eliminating trade evils, fighting drastic legislation and discussing important trade problems. As a general rule these organizations start out as strictly trade bodies, but ultimately become part dealer and part owner organizations and then lose their grip.

We have noticed in a number of instances where the latter situation exists that with owners attending practically every meeting the very object for which these organizations were formed has been defeated. Quite a number of motor truck dealer organizations are holding monthly dinners and meetings and inviting the trade to bring along owner or prospective owner guests. This is all fine and dandy when it comes to a special function of some kind, but not good policy in connection with the regular monthly meetings of the trade organizations. Just as long as there are owners present the dealers will certainly not discuss any problems which would prove embarrassing to them.

A solution suggested is to set aside certain meetings for the trade and make them strictly trade meetings. At these meetings discussions should be held on subjects that are of vital interest to the dealer. Trade evils can readily be eliminated by the dealers, provided they stick together and discuss these problems at their trade meetings. There is very little opportunity of eliminating these conditions unless dealers attend these organization meetings. But they must be strictly trade meetings—the fifty-fifty proposition won't do.

Give Them a Washing

PROBABLY the dealer hasn't any interest in this—he may think it is none of his business—but, really, isn't it? Stand on any busy corner where traffic is heavy and watch the trucks go by. Then take a second look and note the number of them that have not seen a good washing since the last heavy rainstorm. This does not refer so much to the department store trucks in the big cities as it does to the one truck owners and merchants having a small fleet.

The dealer should by means of a diplomatic letter or even a personal visit, tell his customer that he is losing quite a lot of publicity and business when his name, address and his business cannot be read from the sidewalk. The truck in itself is an asset to any business and from an advertising standpoint, it is a traveling salesman. The department stores, florists, dyers and cleaners realize the fact that their machines must be good looking and kept clean. Yes, there's a coal company in Philadelphia that keeps the body and the name plate on its trucks glistening. This company appreciates the value of advertising. There is no reason why other business houses should not do likewise. A dirty looking vehicle cannot inspire confidence in a business house, especially in certain lines.

Would a Motor Truck Dealer do This?

IN a recent issue of *Successful Methods*, a magazine dealing with building, construction, engineering work, etc., an article appeared on the latest version of construction service, the parties involved being a large manufacturer of concrete mixing and placing equipment and a contractor.

We quote the facts verbatim:

"The villain of the piece was a contractor. He bought the concreting equipment and then rigged it up on an insecure tower in such fashion that it could not be operated safely and efficiently.

"The manufacturer, following up the sale with his usual service, discovered the faulty installation and advised the contractor to remedy it. When the advice was ignored, it was replaced by a request and when that was refused a demand was the next step. But the contractor still was obdurate. If the outfit didn't work right he would be the loser and that wasn't anybody's business but his own.

"The old time manufacturer would have left it go at that—even if he got that far. Not the manufacturer with an ideal of construction service, however. Almost before the balky contractor knew what was happening the equipment was removed at the manufacturer's expense and about all he had left was his shaky tower and a sense of shocked surprise. He passed up an opportunity to profit by the friendly help of the manufacturer.

"That's the story and every word of it is true."

This manufacturer first of all had a reputation to maintain. The profits of any one job didn't count with him if that reputation were injured in the slightest degree. So he stuck to his standard and chucked the profits. He isn't worrying over the "Service or Sales" question. "Service before Sales" is his answer.

This is a good lesson for motor truck dealers to learn. Every successful manufacturer has a reputation to maintain. Permitting the motor truck user to misuse a truck, for instance, by overloading or keeping it out of the service station and disregarding the dealer's advice to have it overhauled, are things which will eventually reflect on the truck and on the dealer's establishment. Stick to your prices and your business policies and you cannot lose. It's a good thing to have a stiff backbone when it is a question of safeguarding your own business.

News of the Trade in Brief

Post Office Adds More Trucks

WASHINGTON, D. C., October 31.—First Assistant Postmaster General John C. Koons assigned a number of trucks to post offices throughout the country and another list has just been completed of cities that will soon be using Commerce motor trucks in their local collection work.

At Atlanta, Ga., alone, the postmaster is expecting 500 trucks and it will be from this point that most of the trucks will be shipped by the Post Office Department to other post offices in the country. These Commerce truck chassis mounting a regulation government mail body will be used on collection services, that is, they will transport mail between post offices and railroads or wharf depots and will also collect mail from collection boxes and buildings.

In addition to their work in the collection department of the United States postal service trucks are also being used by the Fourth Assistant Postmaster General James I. Blakeslee's department, transporting parcel post on rural routes. These trucks are operating from post offices located in Pennsylvania, Maryland, District of Columbia, Virginia and Washington. Their average run is about 160 miles a day.

Preparing for Lyons Fair

NEW YORK CITY, Nov. 5.—Motors of every kind are to be a feature of the Spring Fair to be held at Lyons, France, on March 1 to 15, 1920. This is an international fair and the exhibitor comes in direct touch with buyers from all parts of the world.

Booths are still to be had. The rental for a single booth is 800 francs. Those in charge are planning to issue an advance catalogue which will contain the names and addresses of all exhibitors and the commodities they represent. This catalogue will be sent to all countries of the world one month before the fair is scheduled. Those who wish to take advantage of this free advertising must send their entry forms, together with a check to cover the amount of rentals, to 3 Park Row, New York City, by November 24, 1919. Exhibits must be in the hands of the American Express Co., 65 Broadway, New York City, not later than January 15, 1920. Those not wishing to take advantage of the advance advertising have until December 31 to file their entry forms. Any additional information may be obtained by applying to Ernest Perrin, Official Representative of the United States of America, 3 Park Row, New York City.

Coming Events

December 1 to 6, **Des Moines, Iowa**—Tractor Show and Tenth Annual Exposition. Coliseum. Management Iowa Implement Dealers' Assn.

December 2 to 9, **Peoria, Ill.**—Convention State Retail Implement and Vehicle Dealers' Assn. W. L. Derry, Sec., Vermont, Ill.

December 3 to 5, **Cleveland, Ohio**—Ohio Auto Trade Assn. Annual Convention.

January, 1920, **New York City**—International Auto Manufacturers' Congress.

January, 1920, **Washington, D. C.**—Pan-American Congress.

January 3 to 10, 1920, **New York City**—Commercial Cars and Accessories. 22nd Regiment Armory.

January 6 to 8, 1920, **Omaha, Neb.**—Mid-West Implement Dealers' Assn., Auditorium. James Wallace, Sec., Council Bluffs, Ia.

January 10 to 18, 1920, **Kansas City, Mo.**—Tractor Show.

January 10 to 18, 1920, **Brussels, Belgium**—Motor Car Show.

January 17 to 24, 1920, **Cleveland, Ohio**—Cleveland Automobile Show. Wigmore Coliseum.

January 24 to 31, 1920, **Chicago, Ill.**—Commercial Cars and Accessories. International Amphitheatre.

February 9 to 13, 1920, **Louisville, Ky.**—Annual Show and Convention of American Road Builders' Association.

February, 1920, **Deadwood, S. D.**—Deadwood Business Club's Annual Show.

February, 1920, **Chicago, Ill.**—International Auto Manufacturers' Congress.

February 9 to 11, 1920, **Wichita, Kans.**—Tractor and Farm Machinery. Forum. Wichita-Thresher-Tractor Club.

February 9 to 13, 1920, **Louisville, Ky.**—Seventeenth Annual Convention, American Road Builders' Assn. Tenth Annual Good Roads Congress. Eleventh National Good Roads Show.

February 9 to 14, 1920, **Kansas City, Mo.**—Fifth Annual National Tractor Show, direction Kansas City Tractor Club.

February 23 to 28, 1920, **Louisville, Ky.**—12th Annual Auto. Dealers' Assn. First Regiment Armory.

February 24 to March 1, **Kansas City, Mo.**—Motor Car Dealers' Show, Convention Hall. Passenger Cars, Trucks, Accessories.

February 24 to March 1, **Kansas City, Mo.**—National Tractor Show, auspices Kansas City Tractor Club. Guy H. Hall, Mgr., Sweeney Bldg.

March 1 to 6, 1920, **Buffalo, N. Y.**—Auto Dealers' Show.

March, 1920, **New Orleans, La.**—Elks' Auto Fashion Show, an all-outdoor event, at Race Track. Dealers' (indoor) Show follows immediately.

March 13 to 20, 1920, **Boston, Mass.**—Boston

March 1 to 13, 1920, **St. Louis, Mo.**—Mississippi Valley Exposition.
Automobile Show. Chester I. Campbell, Gen. Mgr., 5 Park Square.

April, 1920, **London, Eng.**—Olympia Commercial Vehicle Exhibition.

April 3 to May 4, 1920, **Buenos Aires, Argentine**—Exposition of U. S. Manufactures.

March and April, 1920, **Pretoria, South Africa**—South Africa Products Exposition. (Overseas motor vehicles especially featured.)

May 15 to 20, 1920, **San Francisco, Cal.**—Seventh National Foreign Trade Convention.

Society Automotive Engineers — Meetings: November 25, **Philadelphia, Pa.**—Tractors. Otis A. Hollis. November 28, **Detroit, Mich.** December 11, **New York City.** January 7 to 8, 1920, **New York City.**—Annual Winter Conference. Coker F. Clarkson, Sec. and Gen. Mgr., 29 West 39th St.

Foreign Events

November, **Christchurch, N. Z.**—First National Motor Vehicle Show.

November 7 to 16, **London, England**—Olympia Exhibition. Society of Motor Manufacturers and Trades.

January 10 to 18, **Brussels, Belgium**—Motor Car Show.

Lectures on Foreign Markets

NEW YORK CITY, Oct. 30.—Kingsley G. Martin, who was an officer in charge of a base section in France during the war, gave a most interesting and instructive illustrated lecture before the members of the S. A. E., the Electrical Society of New York and the Motor Truck Association of America, Inc., at the Engineering Society Building. He described the design and workmanship of the foreign trucks used during the war and said our engineering was on a par with that of abroad and that we were much in advance of the Europeans in the matter of standardization.

He interestingly and humorously described how the motor corps solved its many problems in assembling and maintaining trucks and passenger cars and paid high tribute to the ingenuity and skill of the American mechanic. The repair shops and assembling plants were, he said, centers of interest to the French, who marvelled at the speed and activity of the Americans.

Mr. Martin said that a big opportunity for the sale of American trucks exists abroad. There is no group or fleet selling as in this country; neither is there any big distributor. In his opinion the day is not far distant when the saturation point for trucks will be reached in the cities of this country and we must turn our attention to export sales. He named the possibilities in Argentine, Cuba, Brazil, Java, Australia, Sweden, Norway, India and Russia, stating that it would be essential to place men in these fields who could analyze conditions and requirements. These men should know transportation and its every angle, proper bodies, equipment, loading methods, etc., and advise the makers as to the requirements.

Lt. Col. Arthur J. Slade also spoke in a similar vein, stating that although the Europeans knew our trucks through the services rendered during the war, it would require a large amount of educational work to sell American trucks abroad. He believed that standardization, interchangeability of parts, etc., would be factors in making sales and would appeal to buyers accustomed to hand fitted parts. There would also be need of introducing efficient operating systems, cost methods, etc. Col. Slade disagreed with the previous speaker as to the possibility of the saturation point being reached in this country. "It will be many years before this happens," he said. "The rural sections will absorb thousands of trucks and the motor bus industry is still in its infancy."

Highway Train Proves Its Point

SAN FRANCISCO, CAL., Nov. 4.—The first "California Highway Train" is a thing of the past. The train, which was arranged and carried out under the auspices of the Firestone "Ship By Truck" campaign, included a trip to Los Angeles by the valley route and return, by the coast highway. One thousand miles were covered in fifteen days.

It proved to be of great value and if it did nothing else it has opened the eyes of the farmers of the section to the advantages of shipping their perishable goods by truck instead of letting them waste awaiting shipment by freight.

The actual running time from Los Angeles to San Francisco was 51 hours. The time taken for freight shipment is usually 10 to 12 days. This comparison demonstrated clearly that not only is there a saving in time, but there also is a saving in the usual heavy cost allowances for breakage in handling all rail shipments, which requires from six to eight handlings before reaching the consignee.

Farm-to-Table Week

"Motor to the country and fill your market baskets" is the slogan of Farm-to-Table-Week, November 15-22, which has been instituted by the National Touring Bureau of the B. F. Goodrich Rubber Co.

The movement has aroused the interest of all those interested in the automobile industry and through their combined efforts the farming communities of the United States have been asked to be prepared for the large number of city tourists whom, it is hoped, will take advantage of this opportunity to get produce first hand.

It is expected that this campaign will have a far-reaching effect. It has great possibilities of being a potent factor in bringing down the soaring food prices by the truck-patch-to-consumer route. Increased demands on the farmer are sure to result in increased production, which will result in ample supply and its accompanying drop in prices.

M.T.A.A. to Hear of Truck Tour

NEW YORK, Nov. 3.—Members of the Motor Truck Association of America, Inc., comprising operators of fleets of trucks, dealers and distributors, will be afforded an opportunity to note how the West utilizes motor trucks on Thursday evening, November 20, at the Automobile Club of America. Arrangements have been perfected whereby thousands of feet of film will be shown of the National Motor Truck Development Tour. A. R. Kroh, director of the 3500-mi. trip, will address the association. He will speak on the thrills of the trip and what the trucks accomplished. It should prove one of the most interesting and instructive meetings yet held by the association.

Traffics for Central America

ST. LOUIS, MO., October 24.—Dn. Jesus Cocina, a capitalist, mine and ranch owner, of Guatemala City, Central America, recently visited the plant of the Traffic Motor Truck Co. and left an order for several carloads of Traffic trucks, which are to be shipped to Central America immediately. He said that business men in Central America are preparing for the universal use of motor trucks since there are only one or two truck lines in the country and these have very few branches.

He expects to use his trucks for feeders to what few railroads there are. Trucks are especially useful in El Salvadore, according to Senor Cocina, because the frequency of volcanic eruptions make railroad lines a great uncertainty.

Trade Literature

A-B-C of Ford Motor Repairing, issued by Albertson & Co., Sioux City, Ia., instructs Ford owners in the proper way of grinding, refacing and reseating their valves and valve heads by using the "Little Sioux" Ford Tool Set. The tools are duplicates of the larger "Sioux Tools" which are being used in garages throughout the country.

Reo Motor Car Co., Lansing, Mich., has recently published two booklets entitled "Bridging the Gap Between Farm and Market" and "Speed Wagons' Deliver." The latter is composed of testimonials as to the ability of the "Speed Wagon" to deliver the goods. The former gives a small treatise on the development of farm vehicles and testimonials from well known men who have learned the value of the "Speed Wagon" to the farmer.

Resiliency in motor truck operation is the subject of a booklet issued by the Sewell Cushion Wheel Co., of Detroit. It shows how practical and successful resiliency can be obtained if it is secured at the base or starting point of vibration. In this way the vibration is offset before it can pass through the mechanism or working parts of the truck. The treatise also points out the fact that delays caused by repairs are eliminated for the users of cushion wheels since the resilient rubber cushion never wears out nor deteriorates.

Why Magneto Ignition Makes a Good Engine Better, issued by the Magneto Manufacturers, 110 West 40th St., New York City, gives in pamphlet form, a brief comparison of the advantages of magneto ignition with battery ignition. Its contents have been compiled by some of the best engineers in the magneto industry.

J. H. Williams & Co., Buffalo, N. Y., manufacturers of Superior dropped forgings, have just issued a catalog which contains a very simple, non-technical description of the drop-forging process. It is fully illustrated and describes their standard stock specialties together with some of the new line they have recently taken on, including "Agrippa" turning-tool holders, set screw patterns and "Vulcan" forged cutter tool holders.

Ex-German Storage Battery to be Tested

INDIANAPOLIS, IND., Oct. 29.—Engineers at the Prest-O-Lite Laboratories have been requested, by the Bureau of Steam Engineering, Navy Department, to perform a series of tests on the storage battery taken from the ex-German submarine U-117. They are to submit a full report of their findings to the Bureau.

Goodyear Expands

AKRON, O., Oct. 29.—A syndicate of Cleveland investment houses have underwritten a $40,000,000 issue of 7 per cent. preferred stock of the Goodyear Tire & Rubber Co. The present $13,000,000 in 8 per cent. second preferred stock has been recalled for retirement on November 1. The $23,793,800 in 7 per cent. first preferred stock may be exchanged for the new preferred stock. The company has $20,000,000 of common stock, which is now on a 12 per cent. basis, outstanding. The Goodyear Co., together with its Canadian subsidiary, is making 13,000 auto and truck tires a day.

British *vs.* American Cars

CHICAGO, ILL., Oct. 25.—Perhaps the following communication taken from the London Daily Mail of September 15, and sent to the Bush Motor Co., Chicago, Ill., by the English representative, will explain why the English buying public looks with favor upon the invasion of American cars while the automotive trade looks on with fear and trembling.

To the Editor of the Daily Mail.

Sir:

It is stated that the position as regards the American motor car invasion is "serious." Personally I do not care how soon the American cars come. I am sick of the British manufacturer and his methods. Delay—excuse—delay—excuse—and again delay. Despite threats and entreaties, cars are not delivered or even promised. The whole position is "in the air."

Meantime motor agents, many of whom are as bad as "horse-swappers," offer us 200 pounds 1914 cars at 395 pounds, "ready to drive away." If the Americans can produce the goods, let 'em. I am a buyer.

Country Doctor.

Hughson & Merton, Inc., with offices in San Francisco and Los Angeles, Cal., Portland, Ore., and Denver, Colo., have been named as representatives of the Hudson Motor Specialties Co., Philadelphia, Pa., in the states of Washington, Wyoming, Colorado, Oregon, Utah, California, Nevada, New Mexico, Idaho and Los Angeles.

Talks on Labor Unrest

PHILADELPHIA, PA., Oct. 30.—Members and guests of the Pennsylvania Section of the Society of Automotive Engineers, attended a dinner at the Arcadia Cafe on October 23. After the dinner Harry Tipper, of the Class Journal Co., New York City, talked on the present labor unrest and its causes. He pointed out that the present attitude of labor is the logical outcome of industrial and political conditions both here and in Europe for the past century. Labor has organized to protect itself from manufacturers who consider the men as so many machines necessary to the production and the manufacturers on their part have made no effort to educate their men differently. It must be recognized that the human element is much more important in production than the mechanical.

Mr. Tipper emphasized the fact that an educational campaign was necessary to prove to all concerned that the interests of capital and labor are not diametrically opposed.

Hercules Company Revises Sales Policy

CANTON, O., Oct. 25.—The Hercules Motor Mfg. Co., manufacturers of Hercules trucks and tractors, has adopted a new sales policy in order that it may better serve the industry and handle its increasing business. It has divided the United States into five districts, each of which is in charge of a district manager, who has offices in the leading automotive city of each district.

Pennsylvania State Automobile Law goes into effect January first. Copies of this law may be had, gratis, by applying to the Autocar Company, Ardmore, Pa.

More Bus Lines for New York

NEW YORK, Nov. 3.—At a regular meeting of the Board of Estimate plans were introduced to place in operation next week five additional motor bus lines, four of which will be in Brooklyn and will parallel and compete with surface lines. The other line will be in Manhattan. It will compete with a cross town surface line and will afford patrons a ride to Riverside Drive. The street car line terminated at Central Park West.

Combination Body

PEORIA, ILL., Nov. 5.—William H. Schlem has been granted a patent upon a combination undertaking and furniture service body for an automobile chassis. This is aimed to be particularly useful to the undertaker in small country villages who, out of necessity, must have another line of business and cannot afford two rigs for the purpose. He is going to open a plant in East Peoria for the manufacture of this body.

Corrections

C. P. Hepburn has not been appointed president of the Republic Motor Truck Company, Alma, Mich., as was announced in the "Personal Items" column of the last issue. Frank Ruggles is president of the company.

It was stated in the October issue that the Lenhart Motor Truck Company, Minneapolis, Minn., had been organized to distribute Luverne trucks. This is incorrect. The company has been organized for the manufacture of motor trucks ranging from 1-ton to 3-ton capacity.

Truck Owners Organize in St. Louis

ST. LOUIS, MO., Oct. 25.—The Dump Truck Owners' Association has been organized in St. Louis by the owners of motor trucks equipped with dump bodies. Thirty-five owners attended the first meeting at which Charles Conners was elected president, P. J. Ratican, treasurer, and M. J. Smith, secretary.

The association adopted a new scale of prices under which the services of a 2-ton truck cost $22 for a 9-hour day; a 2½-ton truck, $27.75; 3½-ton, $35; 5½-ton, $45, and over 5-ton, $50 a day.

Dyer Bill Becomes Law

WASHINGTON, D. C., Nov. 3.—The National Motor Vehicle Theft Bill, sponsored by Representative Dyer, of St. Louis, has become a law without the signature of the President.

The act, which is aimed to check automobile stealing and joy riding, provides for a five years' imprisonment or a fine of $5,000, or both, for any person who steals an automobile in one State and drives it to another. There need be no proof of any intent to steal the car, so the bill covers joy riding as well as actual theft. The offense consists of taking the car, whether with or without the intent of depriving the owner of its use.

N. A. C. C. Banquet

NEW YORK CITY, Oct. 30.—The annual banquet of the National Automobile Chamber of Commerce will be held on Tuesday evening, January 6, in the ballroom of the Hotel Commodore. In addition to the one speaker which it is customary to have at these banquets, there will be an original play on timely topics in the industry and a presentation of awards to individuals who have rendered important service to the industry during the year.

Four Wheel Drive Auto Co., Clintonville, Wis., is testing out a new type of motor vehicle for use on railroad tracks. Thus far the new device has panned out better than expectations both as to utility and performance and is attracting considerable attention from railroad officials. The experimental car is a standard 3½-ton FWD chassis with flanged wheels and regulation automatic couplers at front and rear.

The Gramm-Bernstein Motor Truck Co., Lima, Ohio, have replaced their old two and one-half, three and one-half and five-ton trucks with an entirely new line, namely, Model 15, which is worm drive, 25, 35 and 50. The prices also have been slightly increased, but this increase is compensated by the addition of a more extensive and complete equipment. This increase in equipment does not extend to Model 15.

Price List of Large Size Pneumatic Truck Tires

	36x6	38x7	40x8	42x9	44x10
Amazon Rubber Co., Akron, O.					
Amazon Cord, non-skid	$98.60	.....	.....	.....	.....
American Rubber & Tire Co., Akron, O.					
Americord, non-skid	109.45	$154.25	$198.75	.....	.....
Bergougnan Rubber Corp., Trenton, N. J.					
Bergougnan Cord, non-skid	112.00	.....	.....	.....	.....
Braender Rubber & Tire Co., Rutherford, N. J.					
Bull Dog Grip, Cord, non-skid	110.40	156.10	201.15	.....	.....
Firestone Tire & Rubber Co., Akron, O.					
Firestone Cord, Triple	99.45	140.65	181.20	$226.95	$317.20
Firestone Cord, non-skid	99.45	140.65	181.20	226.95	317.20
Fisk Rubber Co., Chicopee Falls, Mass.					
Fisk Cord, non-skid	99.45	140.65	181.20	.....	.....
General Tire & Rubber Co., Akron, O.					
General Cord, non-skid	106.25	150.25	193.65	.....	.....
Goodrich, B. F. Rubber Co., Akron, O.					
Goodrich, Ribbed	99.45	140.65	181.20	.....	.....
Goodrich, Safety	99.45	140.65	181.20	.....	.....
Goodyear Tire & Rubber Co., Akron, O.					
Goodyear Cord, Ribbed	99.45	140.65	181.20	.....	.....
Goodyear Cord, All-Weather	99.45	140.65	181.20	226.95	317.20
Hewitt Rubber Co., Buffalo, N. Y.					
Hewitt Cord, non-skid	109.45	.....	.....	.....	.....
Mason Tire & Rubber Co., Kent, O.					
Mason Cord, non-skid	98.50	139.30	179.50	.....	.....
Mohawk Rubber Co., Akron, O.					
Mohawk Cord, non-skid	119.70	.....	.....	.....	.....
Oldfield Tire Co., Cleveland, O.					
Oldfield Cord, anti-skid	104.42	147.68	190.26	.....	.....
Pennsylvania Rubber Co., Jeannette, Pa.					
Vacuum Cup Cord	108.40	153.35	197.60	.....	.....
Racine Rubber Co., Racine, Wis.					
Racine Cord, non-skid	92.20	138.90	178.95	.....	.....
Sterling Tire Corp., Rutherford, N. J.					
Sterling Cord, non-skid	102.95	140.60	178.20	.....	.....
United States Tire Co., New York City					
U. S. Nobby Cord	99.45	140.65	181.20	226.95	317.20

Personal Items

Ralph S. Allen has been appointed general manager of the Duratex Company, Newark, N. J. Mr. Allen, who comes to the Duratex Company from the Wagner Electric Company, will make Newark his headquarters.

George F. Bailey, formerly general manager, has assumed the active sales management of the Dearborn Truck Company, Chicago, Ill.

C. B. Blair has succeeded George F. Bailey as purchasing agent of the Dearborn Motor Truck Company, Chicago, Ill.

B. H. Blocksom has severed his connection with Wilson & Company and is now conducting a business of his own.

E. T. Boland, who has been associated with the Kissel Motor Car Co., Hartford, Wis., is now works manager of the Topp-Stewart Tractor Co., Clintonville, Wis.

Aubrey H. Boyce and **George A. Knerr** have been appointed special Giant solid salesmen of the Firestone Tire & Rubber Co. Their headquarters will be in Buffalo, N. Y.

Harrison H. Boyce, of the Moto-Meter Company, Inc., is now sole owner of the fundamental Erwin Patent fire extinguisher.

A. Brauer, body designer of the Mansfield Steel Corp., has been made assistant general manager in charge of production, quantity surveys and production engineering.

C. J. Brethaur has been made production manager of the Olympian Motor Car Co., Pontiac, Mich.

Ike S. Byrum has been appointed general manager of sales of the Troy Wagon Works, Troy, N. Y. He succeeds R. C. Sykes.

J. B. Childs has been appointed general manager of the Perfection Spring division of the Standard Parts Co., Cleveland, Ohio.

L. H. Clark, until recently a special representative of the Indianapolis branch of the B. F. Goodrich Rubber Co., Akron, Ohio, has been made sales manager for the Continental Auto Parts Co., Columbus, Ohio.

H. E. Clay has been appointed general manager of the Canton division of the Standard Parts Co.

W. J. Ciucas has been made manager of the new Detroit sales office of the Lancaster Steel Products Company, Lancaster, Pa.

Walter P. Coghlan has been appointed general sales manager of the American Hammered Piston Ring Co., Baltimore, Md. He was formerly secretary and sales manager of the Klaxon Co., Newark, N. J.

Charles R. Collins is assistant general manager of the J. & D. Tire Company, Charlotte, N. C.

Fred A. Cornell is to have charge of the newly organized sales activities of the Timken Roller Bearing Co. in Canton, O.

L. W. Coulson, advertising manager of the Dearborn Motor Truck Co., Chicago, Ill., has been appointed sales manager of the territory east of the Mississippi River.

Richard Creifields has been appointed western representative of the Timken Roller Bearing Co. He will have his headquarters in the Peoples' Gas Building, Chicago, Ill.

J. H. Deppler, of the Metal & Thermit Corporation, has been elected vice-president of the American Welding Society.

A. E. Doman, formerly vice-president and chief engineer of the Dyneto Electric Corporation, Syracuse, N. Y., together with Louis Will and William H. Fleisch, has organized and incorporated the Doman Development Corp. The offices are located in the University block, Syracuse, N. Y.

R. H. Faulkner is manager of the newly organized Nash Cincinnati Retail Company, which has been formed for the distribution and service of Nash passenger cars and trucks in Cincinnati, O.

Harry E. Figgie has been promoted to manager of sales of the Perfection Spring division of the Standard Parts Co.

T. J. Stallsmith

Who has been appointed district representative for the Utilitor Sales Division of the Midwest Engine Company, Indianapolis, Indiana.

Leslie E. Freeman has been appointed resident representative in Brazil of the Chamber of Commerce of the United States.

H. C. Freuhauf has been elected first vice-president and a member of the executive committee of the Trailer Manufacturers' Association of America.

Oscar A. Geier has been admitted into partnership with William E. Richards, patent attorney and counsellor-at-law. The offices of the firm, which will be known as Richards & Geier, are at 277 Broadway, New York City.

C. A. Geiger has been elected second vice-president and a member of the executive committee of the Trailer Manufacturers' Association of America.

A. G. Gibbons is now production engineer of the Wetmore Reamer Co., Milwaukee, Wis.

J. I. Harbeck, vice-president of the American Can Co. has been made vice-president and general manager of the Willys Corp. in charge of the Duesenberg Plant at Newark.

Emlen S. Hare, formerly executive vice-president of the Packard Motor Car Co., has accepted the presidency of the Mercer Motors Company, a new organization which has taken over all the stock of the Mercer Automobile Co., Trenton, N. J.

C. H. Hauge has been appointed special Giant pneumatic salesman of the Firestone Tire & Rubber Co. He will have his headquarters at the Cleveland branch.

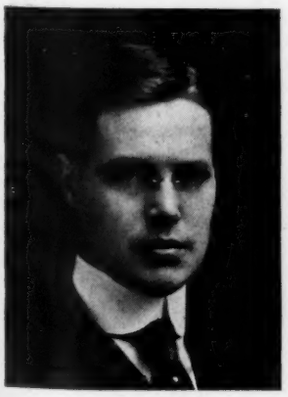
L. L. Heidacher has been made special representative of the Firestone Tire & Rubber Co. for a vast territory extending from Sault St. Marie to Louisiana. He will have his headquarters in Cincinnati.

R. J. Joyce has been appointed sales manager of the Automotive Trailer Corporation, Chicago, Ill. He was formerly associated with the Maxwell Motor Company, Detroit, Mich.

Edw. W. Keefer, having been discharged from government service, is again eastern traveling representative of the Bearings Co. of America.

C. Y. Kenworthy has resigned as vice-president and general manager of the Roamer Motor Car Co., Chicago, Ill. He is now president of the Kenworthy Motors Corp., recently organized for the manufacture, in quantity, of high grade passenger cars. The factory is in Mishawaka, Ind.

M. S. Lines has been made manager of sales of the Gordon Tire & Rubber Co., Canton, Ohio. Mr. Lines was formerly special sales representative in the eastern states for the same company.



E. A. Shelly

Who succeeds C. E. Williams as assistant sales manager, at the home office of the Selden Truck Corporation, Rochester, N. Y.

Fred G. Byers

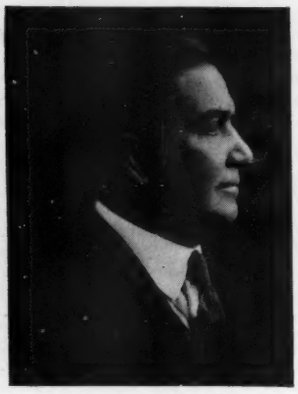
Who has been appointed purchasing agent and manager of the Locust Auto Supply Company, Philadelphia, distributors of the Marathon tires.

Major Basil Cockrell

Of the Royal Engineers, who has been made manager of the interests of the Selden Truck Corporation, in London, England.

G. Norman Baughman

Who is president and general manager of the G. Norman Baughman Company, jobbers and distributors, Tampa, Fla.



Edward H. Fitch

For three years manager of the Philadelphia branch of the B. F. Goodrich Rubber Company, has been made manager of manufacturers' sales, for the entire line of Goodrich products. He will make Akron, O., his headquarters.

W. Halsey Johnson

Formerly associated with the Mack Truck Company and the International Motor Truck Company, has, upon his release from the service, been appointed western sales manager of the Maccar Truck Company.

D. I. Cooke

Supervisor of central district for the distribution of Hercules trucks and tractors, manufactured by Hercules Motor Manufacturing Company Has headquarters at Detroit, and territory includes Gulf States, Ohio, Indiana, Michigan, Kentucky.

Albert A. Zimmerman

Who has been appointed vice-president, treasurer and general manager of the Supreme Motors Company, Warren, O. He has been associated with the Continental Motor Company for fourteen years.

R. J. MacDonald, at one time head of the MacDonald Motor Company, Atlanta, Ga., has been appointed southern sales manager of the Dearborn Motor Truck Co., Chicago, Ill.

H. C. Maibohm, president of the Maibohm Motors Company, Sandusky, O., attended the International Trade Conference, held under the auspices of the United States Chamber of Commerce, at Atlantic City, during the week of October 20. He was chosen, together with about 200 other executives, to meet 80 delegates from England, France, Italy and Belgium.

H. C. Manless, for many years southwestern representative of the mill machinery department of the Nordyke & Marmon Co., Indianapolis, Ind., is in charge of the new office established at Kansas City by Sprout, Waldron & Co., mill builders and furnishers, of Muncy, Pa.

C. H. Meyer has been appointed manager of the western district of the International Tire & Rubber Co., manufacturers of South Bend tires. His territory will include Oregon, Washington, Idaho, California, Nevada, Utah and Arizona.

George McCullen has been named manager of the Western District of the Hercules Motor Mfg. Co., Canton, Ohio. He will have charge of the distribution of all products of the company in the states west of the Rocky Mountains. His offices are located in San Francisco.

Earl W. McGookin is in charge, as sales manager of the Automotive Division, of the office recently opened in Detroit by the Duratex Company, Newark, N. J.

Arthur T. Murray, president of the American Bosch Magneto Corp., left recently for an extended trip abroad for the purpose of investigating the export field and its relation to his company. He is accompanied by his assistant, G. J. Lang.

W. Nelson will supervise the sale of pneumatics in the Hartford territory for the Firestone Tire & Rubber Co.

C. O. Nerad, recently service manager of the Dearborn Truck Company, Chicago, Ill., has been made sales manager of all territory west of the Mississippi River.

C. R. Newby has been appointed field manager for the Bethlehem Motors Corp., Allentown, Pa.

W. T. Norton is now assistant chief, Engineering Branch, of the Motor Transport Corps. He has his headquarters at 7th & B Sts., Washington, D. C. Mr. Norton was formerly chief engineer of the Selden Motor Vehicle Co., Rochester, N. Y.

Carl H. Page now heads a security company recently organized by some prominent automobile men.

Harry Parmele, head of the field service department of the Atterbury Motor Car Co., is making a three months' transcontinental service tour. Mr. Parmele has included in his plans a visit to Clinton and Cleveland, Ohio.; Chicago, Milwaukee, Kansas City, Lusk, Wyo.; San Francisco, Los Angeles, Portland, Ore.; Seattle and many other interesting points. This trip marks the initiation of a new field service by the Atterbury Company in the maintenance of service of Atterbury trucks for both dealers and owners.

W. L. Perley has been made assistant to C. S. Rieman, president and general manager of the Elgin Motor Car Corp., Argo, Ill.

George M. Powell has been appointed territory salesman of the Firestone Tire & Rubber Company for the New England district.

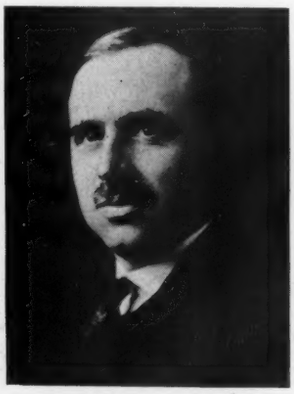
W. S. Reid, for many years sales manager of the Equipment Company, Kansas City, has been placed in charge of the sales department of the A. J. Stephens Rubber Co., of the same city.

John J. Carey

In charge of distribution in the eastern district of the Hercules Motor Manufacturing Company, Canton, O. His territory includes New England and the states along the Atlantic coast. He has his headquarters at Buffalo, N. Y.

C. H. Smith

Has been promoted to managership of the Chicago branch of the B. F. Goodrich Rubber Company, Akron, O. He will have charge of both the Diamond and Goodrich sales, as well as the company's entire line of rubber products.



H. J. Morehead

For four years manager of the New York branch of the B. F. Goodrich Rubber Company, has been made manager of the company's Philadelphia branch and will manage the sales of both Diamond and Goodrich tires.

Allen Kendall

Who is in charge of the Midwest district for the distribution of the products of the Hercules Morror Manufacturing Company in Illinois, Wisconsin, Minnesota, Missouri, Nebraska, Kansas and Dakotas, His headquarters are in Detroit.

Parke Ross has severed his connection with the Elgin Motor Car Corp., Argo, Ill., and is now associated with the Dupont Motor Manufacturing Corporation, of Wilmington, Del. Mr. Ross is treasurer of the company and has direct supervision of sales.

H. M. Rothschild has been promoted to special Giant pneumatic salesman in Greater New York for the Firestone Tire & Rubber Co.

Charles E. Salter has been appointed export manager of the Dearborn Motor Truck Co., Chicago, Ill.

L. C. Simon has been added to the sales force of the Columbus branch of the Firestone Tire & Rubber Co.

R. D. Snedecker has been promoted to truck tire salesman for the Firestone Tire & Rubber Co.

John T. Spicer has been appointed general sales manager of the Thermoid Rubber Company. He will have his offices at the factory in Trenton, N. J.

Judd W. Spray, former western representative of the Timken Roller Bearing Company, has been transferred to Detroit, as central representative of the company. He has offices at 701-02-03 Book Building.

Edward M. Stock has been elected managing secretary of the Spokane Automobile Chamber of Commerce to succeed George Lantz, who resigned to take the agency for the Stanley Steamer in the Yakima district.

R. C. Sykes has resigned as general manager of sales of the Troy Wagon Works, Troy, N. Y., and has become a controlling interest in a private business.

Edward Tucker, Jr., formerly with the Detroit Retail Branch of the Cadillac Motor Car Co., has accepted a position with the Lafayette Motors Co., Indianapolis, Ind.

P. F. Willis, president of the Henderson-Willis Welding & Cutting Co., has been elected a director of the American Welding Society.

Robert L. Wilkinson has succeeded Walter P. Coghlan as sales manager of the Klaxon Co., Newark, N. J.

New Agencies

Douglas Boswell Co., Sacramento, Cal., has the agency for Acme trucks in California and Nevada, as far east as Elko county.

Eisemann Magneto Corp., Brooklyn, N. Y., has purchased a piece of ground on Michigan Ave., Chicago, Ill., on which it will erect a service station, garage and repair shop. A full supply of Eisemann products will be carried in stock.

L. M. Field
Who has been appointed western division sales manager of the Selden Truck Corporation, Rochester, N. Y.

Duplex Engine Governor Co., Inc., Brooklyn, N. Y., has opened a Pacific Coast branch at 17 Pear St., San Francisco, Cal.

Herman Motor Sales Co., 99 Windsor Ave., Hartford, Conn., has taken on the Atlas and United States trucks.

Grand Rapids Overland Co., Grand Rapids, Mich., has been appointed agent for the Acme truck.

Triangle Motors Co., distributors of Moon cars in Eastern Massachusetts, Maine and Portsmouth, N. H., is opening a salesroom at 1094 Boylston St., Boston, Mass.

Hamilton Motors Co., manufacturers of the Apex truck, has opened an export office in New York City. C. B. Rise is in charge.

Bethlehem Motors Co., Allentown, Pa., announces the following distributors: R. L. Cameron Automobile Co., Dallas, Texas; Roamer Motor Car Co., Huntington, W. Va.; Monroe Auto & Supply Co., Monroe, La.; Luke Sales & Engineering Co., Minneapolis, Minn.; L. E. Gallahorn Co., Reno, Nev., and Schneider-Merriman Motor Car Co., Springfield, Mo.

Pennsylvania Rubber Co., Jeannette, Pa., is planning to open sales and display rooms in the Garden Pier, Atlantic City, N. J. C. B. Williamson will be in charge.

Lippincott Motor Co., 2120 Market St., Philadelphia, Pa., have been appointed distributors of the Hudson Flexo Slip Drive and Frame Extension for Ford worm drive trucks manufactured by the Hudson Motor Specialties Co., Philadelphia, Pa. Their territory will include Southern New Jersey and Eastern Pennsylvania.

General Motors Truck Co. of Pittsburgh, Pittsburgh, Pa., has been recently formed to handle GMC trucks in Western Pennsylvania, West Virginia and part of Ohio. J. S. Haynes is general manager.

Removals and Trade Changes

Ransomes, Sims & Jefferies, London, Eng., engineers and boiler makers, have moved their offices to 46, Queen Victoria St., E. C. 4, London, Eng.

Manly Motors Corp., Waukegan, Ill., has changed its name to the O'Connell Motor Truck Co. They are revising their models as well and are now making a new line of trucks known as the "Super Trucks."

Service Motor Truck Co., Wabash, Ind., has just moved its offices into a new brick and reinforced concrete administration building, three stories high. The building contains over 20,000 sq. ft. of floor space and besides the offices includes recreation rooms, visitors' rooms and a large auditorium where sales conventions are to be held.

Black & Decker Mfg. Co., Baltimore, Md., manufacturers of portable electric tools, electric air compressors and special machinery, have moved their general offices from 105 S. Calvert St. to Towson Heights.

Knox Motors Co., Springfield, Mass., has been sold to Neil R. Sinclair, president of the Militor Motors Corp. The company will continue the manufacture of its present products and is planning to increase these lines.

Edward V. Hartford, Inc., Jersey City, N. J., are now in a new factory at West Side Ave. and Carbon Place. Their executive offices have been moved to 35 Warren St., cor. Church St., New York City.

Frontenac Motor Co. has moved from Plainfield, N. J., to Indianapolis, Ind.

Martin V. Kelly Co. have moved their New York City office from 171 Madison Ave. to 19 West 44th St.

Standard Steel & Bearings, Inc., is the name given to the combination of the Mar-

J. G. Cashin
Who has been made advertising manager of the Acason Motor Truck Company, Detroit, Mich. He formerly held a similar position with the Standard Motor Truck Company.

Lee J. Eastman
President of the Packard Motor Company of Philadelphia, who has been elected president and general manager of the Packard Company of New York.

J. H. Staley
Who is president of the Continental Auto Parts Company, Columbus, Ind., manufacturers of the Continental Motor stands used on Liberty and other motors.

E. P. Rowen
Who, after fourteen years' service as manger of the Chicago branch of the B. F. Goodrich Rubber Company has been called to Akron, Ohio, to become manager of sales for the entire United States.

lin-Rockwell properties. The constituent plants are the Standard Roller Bearing Co., Philadelphia, Pa.; the Braeburn Steel Co., Pittsburgh, Pa.; the Rockwell Drake Bearings Division, Plainville, Conn.; the Willow Street and Hamden Divisions, New Haven, Conn., and the Norwich Division, Norwich, Conn. The new organization, which is owned and operated by the Marlin-Rockwell Corp., has its executive offices at 347 Madison Ave., New York City.

J. & D. Tire Co., Charlotte, N. C., has changed its name to McLaren Rubber Co.

Ohio Trailer Co., Cleveland, O., has changed its name to the Ohio Motor Vehicle Co. At a recent meeting of the directors of the company it was decided to increase the capital stock of the company from $300,000 to $1,000,000.

Continental Auto Parts Co., manufacturers of shop and factory equipment, have moved to a larger and more modern factory in Columbus, O.

Chilton Co., Philadelphia, Pa., have moved their Detroit office to 1408 Kresge Building.

New Incorporations

Curtis Motor Car Co., Little Rock, Kans., has been formed for the manufacture of passenger cars, trucks and tractors. Designs for the Curtis 6 have been completed by Fred H. Berger, who is consulting engineer. Officers of the company include: Chas. E. Taylor, president; A. W. Sloss, secretary and sales manager; Chas. Bizzell, vice-president and agency manager, and H. Anderson, treasurer.

A. J. Stephens Rubber Co., Kansas City, has increased its capital stock to $1,500,000 and expects soon to enter upon the manufacture of tires and tubes in addition to its present line of tire and fabric products.

Tide Water Oil Sales Corp. has been organized to handle the sale and distribution of the Veedol Motor Oil and Tydol Gasoline for the Tide Water Oil Co. It will have its headquarters at 11 Broadway, New York City.

General Top Co., Cleveland, O., has recently been incorporated for $1,000,000. In addition it has acquired the entire assets of the Consolidated Auto Top Co. A building adequate to the large production contemplated will be ready early in 1920. C. R. Vorton, for many years general sales manager of the Packard Motor Car Co., of Detroit, is president of the company, and Christian Girl, president of the Standard Parts Co., Cleveland, O., is vice-president. The product of the General Top Co. is known as the Artcraft Top.

Factory News

Automotive Body Corp., Chicago, Ill., manufacturer of motor car bodies, now occupies the entire building at 1211-15 Clybourn Ave. The factory contains 40,000 sq. ft. of floor space.

Cole Motor Car Co., Indianapolis, Ind., is preparing to increase its output from 6500 cars to 12,000. The plant is now being enlarged to make this possible.

Black & Becker Mfg. Co., Baltimore, Md., manufacturers of drills, announce that the first unit of the new plant which they were erecting at Towson Heights, Md., will be ready for production about December 1st.

Acme Motor Truck Company, Cadillac, Mich., has begun the construction of the first of four units to be built in order to sufficiently increase the production capacity of its factory. These units, when completed, will double the capacity of its plant.

O & S Bearing Company, Detroit, Mich., manufacturers of O & S Never Oil bearings and bushings, have moved into their new factory at 214-18 Artillery Ave.

Hamilton Motors Company, Grand Haven, Mich., formerly known as the Panhard Motors Company, is now occupying its new factory, which is double the capacity of the old plant. The company manufactures the Apex truck, until recently called the Panhard.

Canadian Pressed Steel Co. has completed plans for the erection of a plant on the land purchased from C. Harold Wills and John R. Lee, Marysville, Mich.

Willys-Overland Co. announces that the Overland plant in St. Paul, Minn., is to be made into an assembliing plant for the shipment of automobiles throughout the northwest.

Eisemann Magneto Corporation, Brooklyn, N. Y., finds that it is again necessary to increase its floor space and personnel in order to take care of the increasing demands for its products.

Firestone Steel Products Co., Akron, Ohio, a subsidiary of the Firestone Tire & Rubber Co., has broken ground for an additional $1,000,000 plant. This company produces annually 1,250,000 demountable rims for pneumatic and automobile tires and 65 per cent. of the steel bases used in the United States for solid truck tires.

Portage Rubber Co., Akron, Ohio, has ordered the immediate preparation of plans and specifications for a three-story addition to its factory. This addition, which will be 80 x 200 ft., will cost about $200,000.

Mason Tire & Rubber Co., Kent, Ohio, has begun the building of additions to its factory which, it is claimed, will make the company fifth in the matter of production among the tire manufacturers of the Akron district. These additions are to the general and factory offices, the garages and the restaurant. In the same enclosure the contractors are putting the finishing touches on the main building of the Mason Cotton Fabrics mill.

Perfection Piston Ring Co., Ravenna, O., is now in production in its new factory, where it is making a complete list of standard size rings.

Winther Motor Truck Co., Kenosha, Wis., is about to purchase a tract of land in Milwaukee, Wis., on which it contemplates erecting a large factory to operate in conjunction with the one at Kenosha.

Charles Lord

Chas. F. Lord, general patent attorney and manager of the patent department of the International Harvester Corp., died on Sept. 25 as the result of an automobile accident.

Mr. Lord was born in Somerville, Mass., in 1875, was a graduate of Massachusetts Institute of Technology, and the law school of Georgetown University. He held many positions of trust and has been in charge of all Harvester patent and trade mark business since 1912.

He was a fellow of the American Institute of Electrical Engineers, a member of the American Society of Mechanical Engineers, Society of Automotive Engineers, Engineers' Club of Chicago, American Patent Law Association, University Club of Washington, D. C., and other technical and social organizations.

N. E. Oliver

Has been made manager of the New York branch of the B. F. Goodrich Rubber Company. He will continue the supervision of the Diamond sales in the New York district.

Joe Spery

Who has been placed in charge of the production of the Hooven Radiator Company. Since he has assumed charge the production of the company has increased 300 per cent.

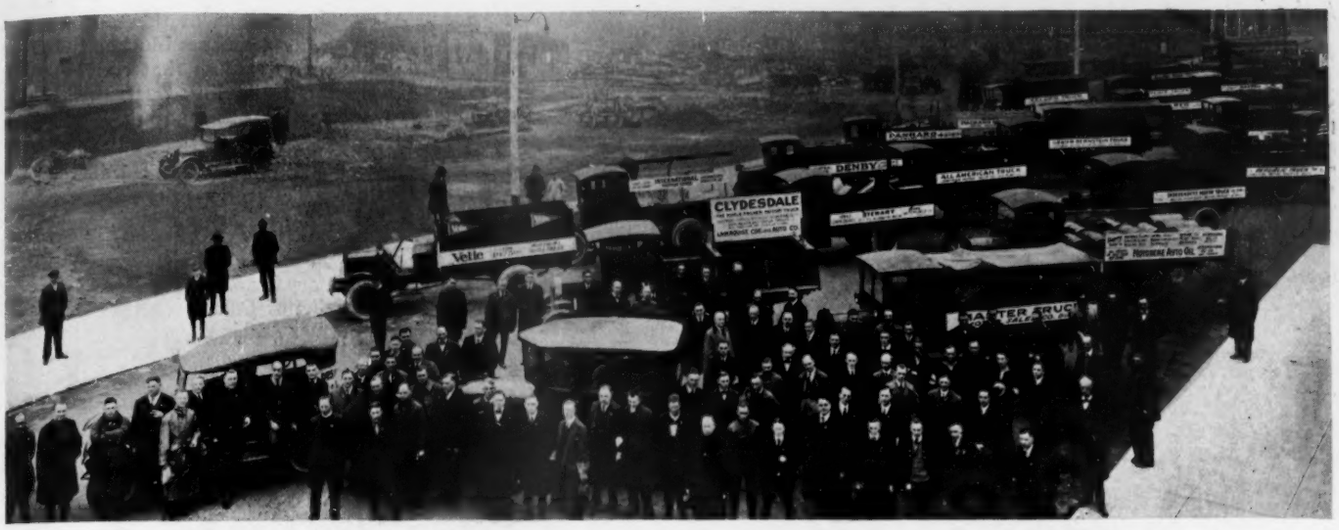
Walter Y. Anthony

Who, after a number of years' association with the Packard Motor Car Company of Philadelphia, has been appointed general manager of the company to succeed Lee J. Eastman.

H. L. McClaren

President and treasurer of the McClaren Rubber Company, Charlotte, N.C. Mr. McClaren was formerly president and general manager of the Racine & Ajax Rubber Company.

Des Moines Truck Tour Goes Over Big and Dealers Plan Thirty-Day Trip for Next Year



In Spite of Heavy Rains and Deep Mud Iowa Trucks Spread Motorization of the Farm Propaganda Among Thousands of Farmers. Dealers Are Enthusiastic Over Results of Tour and Will Conduct Big Tour Next Spring

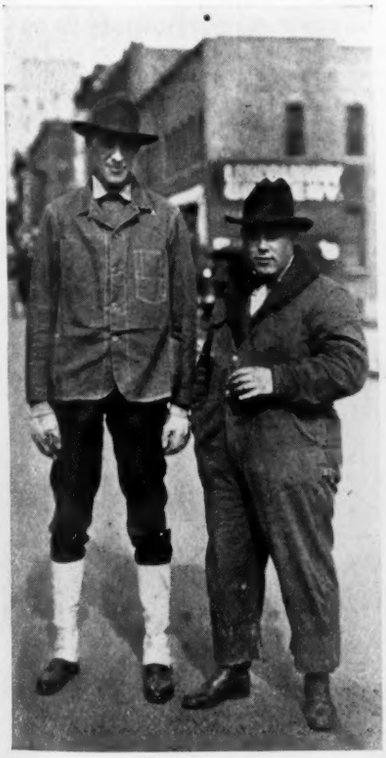
By A. V. COMINGS

INSPIRED by the success of the National and other motor truck tours and confident of the good results awaiting their efforts along similar lines, the truck dealers of Des Moines staged a thoroughly successful tour around a circuit of mid-Iowa towns and villages in October. In the number of trucks entered it was the largest tour thus far conducted, for 27 trucks wound out of Des Moines on the morning of Monday, October 18, when the tour started. Saturday afternoon the train rolled back into the Des Moines control, with 467 miles of good, bad and almost impassable roads to its credit, and a record of doing more to promote motor truck sales throughout the rich farm country around Des Moines than had ever been accomplished before. Every dealer who entered a truck was enthusiastic over the results achieved; so enthusiastic, in fact, that already plans are being made for a thirty-day tour to be conducted by the dealers next spring.

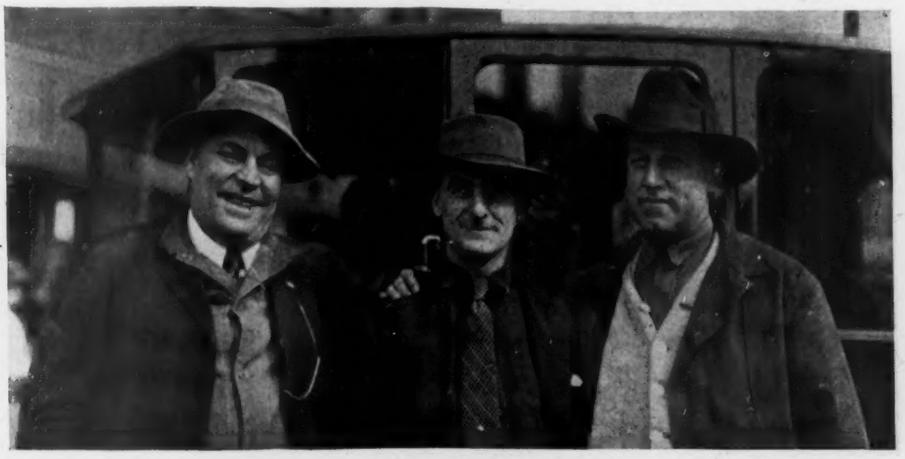
The unusual organization of the automotive trade in Des Moines, where each branch of the industry is affiliated with the Des Moines Chamber of Commerce through the Motor Trades Bureau of that body, made it possible to enlist the support of all lines of business in the various communities traversed by the tour, and the co-operation of the chamber in this way helped materially in getting the proper attention for the caravan all along the route.

The Des Moines Motor Truck Dealers' Association was in active charge of the tour, and its president, Harter Hull, worked night and day before and during the tour in perfecting the details that contributed to its entire success. In this he was assisted ably by Don Chemberlin, secretary and treasurer of the association; R. P. Bailey, of the Goodyear Tire & Rubber Co.; Ralph H. Faxon, secretary of the Des Moines Chamber of Commerce, and others in the motor trades bureau in all its branches.

A. R. Kroh, who accompanied the National Motor Truck Development Tour as principal speaker and manager,



They Call 'Em Mutt and Jeff
R. P. Bailey and Don Chemberlin, who worked hard to make the big tour a success



Left to Right: L. H. Boydston, Trainmaster; Harter Hull, President Truck Dealers' Association, and A. R. Kroh, Principal Speaker

A. R. Kroh Speaks to a Gathering of Farmers at an Iowa Town

contributed his services to the Des Moines tour as speaker, and at every stop on the tour talked to audiences of farmers and others interested. His wide knowledge of actual farming conditions and the relation of motor transportation to the farm made his addresses of the deepest interest, and the thousands who heard him were given food for much thought along the subject of motorization of the farm.

Ralph Faxon, secretary of the Des Moines Chamber of Commerce, also accompanied the tour, alternating with J. B. Weaver, the chamber's president, and each spoke to the large audiences gathered wherever the caravan stopped.

L. H. Boydston, well known in motor truck circles, acted as trainmaster on the trip, and took the trucks through in fine shape, though the roads in several places were almost impassable on account of the heavy rains. His thorough knowledge of the capabilities of modern motor trucks made his services valuable in handling the train, and the caravan came through in fine shape in the face of great difficulties. Fred Van Vliet, of Des Moines, acted as assistant tourmaster until the pilot car, in a wild moment, ran over one of his feet, breaking a small bone and putting him into the discard for the remainder of the trip, a loss the men on the tour felt keenly.

make things interesting, the Winther truck, entered by the Navy at Des Moines, slipped gracefully off the high crowned road into a convenient ditch. More work, and this truck returned to the fold.

Out of Chariton, at the top of a two-mile hill, the road was blocked by a dead horse, one of a team that couldn't stand the strain of hauling over Iowa roads, and, in getting around this obstacle, there was grief for the whole train.

Twenty-seven miles of hill road, all freshly graded, was the big test the trucks had to meet on Wednesday, and

Secretary Faxon, of the Des Moines Chamber of Commerce, Speaking to a Farmer Audience.

The trucks left Des Moines early on the day of the start, and they had easy going till they ran into heavy rains in the southern Iowa hills. Here newly graded roads, slippery with a thin coating of mud, and so soft in spots that the cars went in up to their hubs.

The GMC truck, with a 3800-lb. load of oil in drums, went down a hill out of control, and slipped off the side of a 12-ft. culvert, the two wheels on one side going off the side of the culvert.

Hard work brought the erring one back to the narrow path, and then, to it put the caravan so far behind that night found the trucks strung along the road for many miles, and many had no lights with which to do night driving. Rain was falling in torrents, and in spite of tremendous efforts, it was found impossible to make the original schedule, calling for a stop at Creston early Thursday. A detour through a soggy cornfield, around a newly dug culvert ditch, was one of the tasks the trucks accomplished on this wild night.

From Winterset, the next night's stop, all was easy going, however, and the

From Left to Right: Dean Schooler, President Des Moines Automobile Dealers' Association. Mr. and Mrs. A. R. Kroh. Mrs. Kroh Accompanied Her Husband on the Tour. Ralph Faxon, Secretary Des Moines Chamber of Commerce, One of the Speakers on the Tour

A Fair Sample of an Iowa Town Main Street

train came through without a further break in the schedule.

The greatest reception to the trucks was received at Oskaloosa, where the fleet was welcomed with a band, part of the motorized fire department, and over 5000 people, who were addressed in the public square and given the message the tour carried. At Chariton a big program had been arranged, but it was cut short on account of the downpour of rain. So impressed were the Des Moines truck men with the interest shown here, however, that a separate tour is to be run later, taking in Chariton and Creston, the latter town having been cut out of the original tour on account of the roads.

At Perry thirty local trucks came out to meet the tourists and escorted them to town, with a brass band on one of the trucks blaring the way into the city. A big crowd was gathered in the public square for the evening's program, and the speakers found an interested and thoroughly attentive audience. Moving pictures of truck operation were shown, as at the other night stops, and the interest shown by the big crowd was very evident. The Perry Chamber of Commerce tendered the visitors a banquet which was complete in every way.

Boone and Madrid, on the last day of the trip, turned out large crowds of interested farmers, who gave closest attention to the talks by Mr. Kroh.

One of the big attractions of this tour was the presence in the caravan of seven of the National Motor Truck Development tour trucks, veterans that attracted much attention all along the route. These trucks went overland to Des Moines from Milwaukee, after the end of the 3500-mile national tour, in most cases being driven by the same men who took them on that long grind. To them the Iowa tour was an easy jaunt. The national trucks entered were the Service, Selden, Hawkeye, Maxwell, Clydesdale, Master and Sterling, the latter being the Goodyear tire service truck.

The other trucks making the trip were the Velie, Dodge, International, Stewart, Ford, GMC, Denby, All American, Independent, Panhard, Gramm-Bernstein,

Chains Were in Great Demand on Some Iowa Roads

Republic, Packard, Reo, Diamond T, Commerce, Nash, Traffic, Winther and International (oil tank).

In spite of the bad weather met with on part of the trip the Des Moines dealers are enthusiastic over results and the 30-day tour planned for next spring will be along bigger and broader lines, and will take in practically the entire state.

Overloading Partly Due To Laxity of Manufacturer

To the Editor:

Regarding the question of overloading brought up in your issue of October 15, by Mr. Geo. H. Pride, the writer would like to take up the "Club" used by Mr. Pride and bring up a few points which may deserve consideration and possibly may be viewed from a little different angle than that expressed by Mr. Pride.

The writer believes it is of extreme importance that the industry in general appreciates the seriousness of the overloading question and combat it with equal force. The reputation of any product naturally depends upon the results obtained from its use, but the impressions that others than operators secure from the observations of the service given by any equipment is based entirely upon what they see and unfortunately at all times this does not include all the facts of the case.

Any customer who has his money invested in a motor truck naturally can use the truck as he sees fit. On the other hand, the majority of operators are interested in securing the maximum miles per dollar of operation and investment expense. We believe therefore, that the factory rating should be such as is supposed to give a maximum ton miles per dollar of maintenance cost, and it has been the writer's observation that the majority of builders are rating their trucks in this manner. The rating by no means represents the maximum carrying capacity under ideal conditions but it does represent the capacity which should be handled if it is desired to get the maximum ton miles out of the truck at the lowest expense.

There seem to be too many manufacturers who are unwittingly encouraging overloading by not demanding of their dealers a careful check of the method of operation of the trucks they sell; the local discouraging of overloading tendencies, and the demanding of payments of parts which need replacement due to service imposed upon them which is beyond their intended capacity.

Not only are the dealers lax in expecting the owner to pay for the parts broken in this manner but many factories are themselves winking at this practice and are replacing parts which may break without the proper analysis of the situation and refusal of replacement under such conditions.

It seems to us as though the one particular manner in which this can be stopped is the co-operation of dealers' organizations, motor haulage associations, legal departments or highway departments of various states which can control the amount of weights carried per inch width of tire and the manufacturers themselves. If the rating of trucks, that is, the suggested loading of a truck, is of no value, it is foolish for the manufacturers' association to maintain this practice of giving a rated capacity. It likewise seems follish to be forced to build a truck of five-ton capacity and rate it as a 3½-ton size in order to permit of a reasonable factory safety when used as a five-ton unit, which practice is being followed by so many operators.

Are very pleased to note that the "C. C. J." is giving this matter its usual careful consideration.

E. A. HASKINS,
Service Manager,
Federal Motor Truck Co.

EFFICIENT REPAIR METHODS

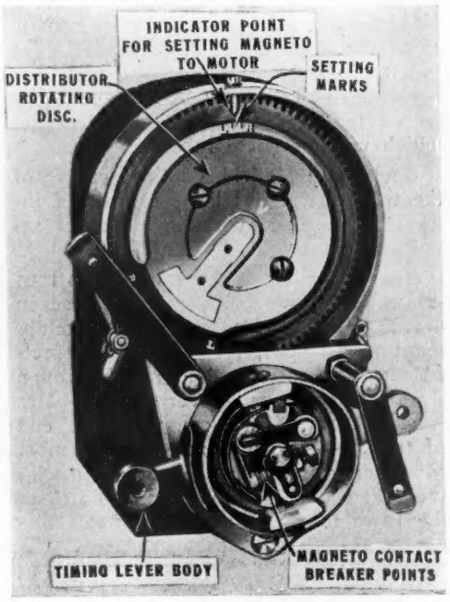
Editor's Note: This department is conducted primarily for the new repairman and dealer; also the repairman in the smaller towns who is anxious to place his shop on a better paying basis and do his work in a more systematic manner. We shall appreciate any suggestions or criticism that will help us make this department satisfy your needs.

Repairing and Testing Eisemann Magneto, Model G-4

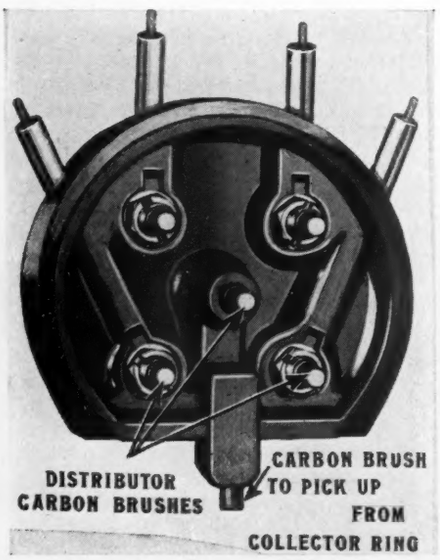
General Points on Magneto Repair With Which All Truck Repairmen Should be Acquainted

THE following are the methods employed by the service department of the Eisemann Magneto Corp., Brooklyn, N. Y., for testing a magneto returned to the factory and when claim is made that no spark can be obtained after the more simpler methods of determining the trouble have failed; that is, after the switch has been examined, ground wire removed from breaker box, distributor and breaker mechanism cleaned, contact points cleaned, trued and adjusted, spark plug cables and plugs tested, etc., directions for which are contained in an instruction book published by the company.

The suggestions contained herein are for testing the Eisemann G-4 type of magneto and do not include all work completed by the factory service department or at its factory appointed service stations, but comprise those tests which can be made by the truck repairman having a practical knowledge of the fundamental principles of magnetos and ignition. If after carrying out the instructions herein, and which are illustrated, the magneto fails to function properly it should be sent to the factory or the nearest service station. There is certain work that should not be attempted by other than the factory or service station expert. Viewed from the service to the truck owner angle it will be cheaper and more expeditious to send the magneto to the factory or the service station, as either will complete the work and return the instrument in less time than will be spent by the repairman in experimenting.



The Eisemann GU Magneto With Distributor Plate and Breaker Cover Displaced

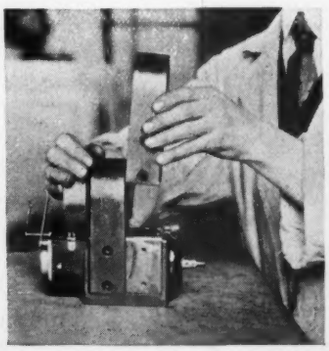


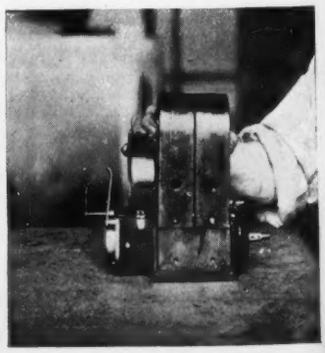
The Distributor Brushes and Collector Ring Carbon Brush

Disassembly and adjustment should not be attempted with ordinary tools. Those used and advocated by the company are not expensive and are as follows: A 3 and 6-in. wood handle screw driver, an Eisemann contact file, and Eisemann wrenches, Nos. 9169, 6799, 9018, 14689 and 14734 wrenches. These may be obtained direct from the factory or its service branches. Wrench No. 9169 is employed for the spring type of breakers, has a socket for removing the breaker fastening screw, another for removing the distributor binding nuts, an end wrench for the contact screw and a contact point gauge. No. 6799 has two sizes of sockets for removing breakers, tightening coil terminals, etc., also a 3-16-in. screw driver. No. 9018 is employed on the rocker arm breaker type of instruments, has a hexagon for displacing the breaker fastening screw, another for the coil terminal nuts, an end wrench for the contact points and a gauge for the contact points and one for the spark plug gap. No. 14689 is a special breaker point wrench for adjusting the points. No. 14734 is utilized for removing the studs retaining the distributor and breaker retaining springs.

Removing Distributor Plate

Assuming that the simpler methods have failed, that no spark is obtainable and that the magneto has been removed from the engine. Place the magneto on the bench and **slip the distributor plate spring to one side** with the left hand, grasping the plate with the fingers of the right hand. Next **tip the plate forward,** as indicated in an accompanying illustration, and tip about ¾ in., so as to clear the carbon brush that makes contact with the collector ring.





The Wrong and Right Way to Remove or Replace Magneto

The sliding across the face causes demagnetization

Do not pull plate forward and away, but **tip and lift off and up.** Unless this be done the brush may be broken and a part fall in between the collector ring and housing, forming a path for the current or creating a ground. Should a section of the brush drop in as described, turn magneto upside down and shake. Always do this before attempting any tests.

Inspection of Distributor Disc

The distributor plate, disc and collector ring should next be cleaned with a soft cloth (not a linty one or waste) moistened with clean gasoline. The breaker box components should be thoroughly cleaned with a small, soft brush, dipped in gasoline. Dry all parts thoroughly before making any tests.

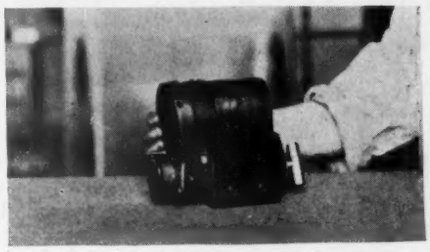
Examine distributor disc for burning of brass member or plate and if burned the effect will be noticeable at either side of the brass member. The cause of burning should be located before replacing and generally results from an improperly timed distributor gear, correction of which will be described later. **Next test for spark.** Take the 3-in. screw driver in the left hand and place blade on frame with tip of blade ⅛ in. from collector ring, which is exposed when distributor plate is removed. Grasp the drive coupling (it is assumed it is on the magneto and should be left on) with the right hand and rapidly rotate armature shaft in the proper direction, clockwise or anti-clockwise. This is indicated by an arrow on the driving end. If a spark jumps from the tip of the screw driver blade to the collector ring or vice versa, it indicates that the fault is not in the armature. Further inspection should be made of the distributor, its brushes and the cables and plugs, as previously described.

Testing Cam Action

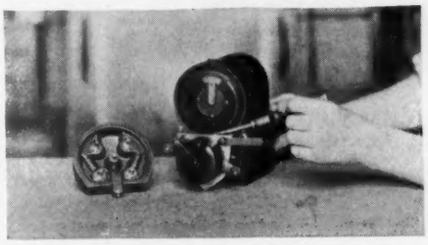
If cylinders firing alternately seem weak or erratic, rotate the armature shaft a complete revolution and **note if the breaker points open equally wide on both cams.** A variation in the size or intensity of the spark is possible with a worn cam or breaker box housing. The last named member should fit closely on its bearing seat, but an injury or excessive wear will bring about an incorrect separation of the contact points, causing the engine to operate erratically. This condition may exist with the points perfectly flush and clean and correctly gaged at one cam. It should be explained that the common, **erroneous practice is to set the points by one cam and not gauge and check at both.**

Shimming Cams

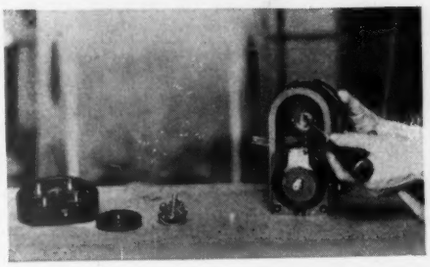
Should one cam cause a lesser opening of the contact points than the other, it may be raised, which will decrease the opening, by using shims .002 and .004 in. thick, sold by the Eisemann Corp. for this purpose. **Remove the breaker box by slipping forward.** Use 3-in. screw driver and displace screw securing cam to the body. Shim the low cam and replace screw, but test break brought about by both cams before locking the screw. The break must be exactly alike. It is advisable to clean the points previous to this work and it is fitting to mention that much of the supposed magneto trouble is due to an oil mist on the contact points caused by the use of oil in the breaker box or flooding the instrument. Finally the **cam screw must be locked**



Tip Distributor Plate Forward About Three-Quarter Inch Before Removing Plate, to Avoid Breaking Collector Ring Carbon Brush



To Test Spark, Place Blade of Screwdriver on Frame With Tip of Blade One-Eighth Inch From Collector Ring and Rotate Armature



To Displace Breaker Disc, Place Tips of Screwdriver Blades Between Disc and Frame and Exert Even Pressure.

When Replacing Distributor Gear, Hold Oil Wick in Place so as to Clear Shaft. Illustration Also Shows Lock Spring-Plate Pushed to One Side.

by punching the surrounding material into the slot of the screw. See to it that there is a **good support under the cam itself to avoid bending of the breaker box** when locking the screw.

If the test for spark fails, examination should be made of the breaker. **Displace the cover cap** by inserting the small screw driver under slip spring, relieving its tension, then **slip spring to one side. Remove cap and withdraw breaker retaining screw.** This is a hexagonal screw in the center of the disc and retains the latter to the armature shaft and rotates with it. Use socket end of tool No. 6799, holding coupling end of magneto with one hand. This screw has a right hand thread for both clockwise and anti-clockwise rotating magnetos.

Removing Breaker

The next step is to **remove and test the breaker.** Use the 3 and 6-in. screw drivers, placing the tips of the blades in back of the breaker disc and diametrically opposite, as shown in an accompanying illustration, and exert an even and gentle pressure outward on the disc. The disc is keyed and there is a keyway on the shaft. **In replacing disc care must be taken to see that key registers with keyway.** This is important and failure to observe caution is responsible for many magnetos being returned to the factory.

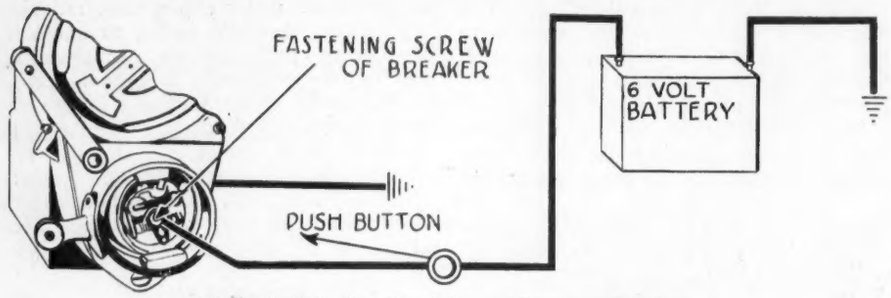
On the breaker disc will be found a **contact block carrying the adjustable contact screw.** This block is secured to the disc proper by an insulated screw and there is insulation also between the block and the disc. Test should be made to determine if either of these insulations have been damaged, broken down or incorrectly placed in attempting a previous repair. **Place a piece of cardboard between the breaker points** to keep them separated. From a lighting circuit run one wire to the metal part of the disc (not the contact block) and run the other lead to a lamp, thence to the metal part of the screw in the contact block. If the insulation or bushing be broken the lamp will light as the current will flow from the metal of the disc to the screw through the broken insulation, indicating a ground. If such be the case **send the breaker to the service station or the factory,** as the repair is one that cannot be successfully prosecuted by other than the expert.

Testing Armature

A simple **method of testing the armature** is shown in an accompanying illustration. With the breaker retaining screw in place run a wire from a 6-volt battery through a push button to the screw. Ground the other lead of battery to either the frame of the magneto or a surface plate if the instrument be placed on it. Use small screw driver, as in making test for spark and press button. If armature be in good condition a spark will jump from the blade of screw driver to collector ring. **To avoid demagnetization of the magnets, the armature should have the keyway in the drive shaft at the top when making this test.** This is very important.

Timing Distributor Gear

Failure of the magneto to deliver a hot spark and burning of brass plate of disc is due to a mechanic changing the setting of the gear in an endeavor to "improve" upon the factory timing of

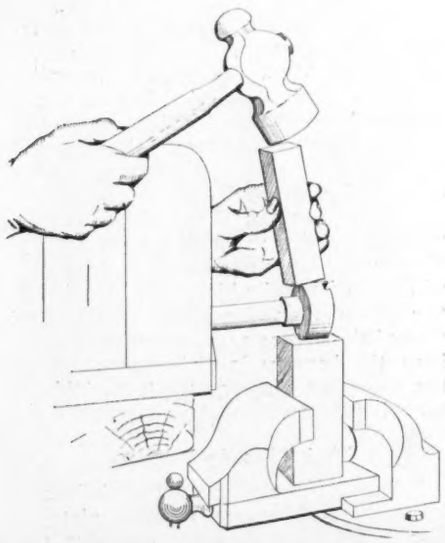


Method of Testing Insulation of Screw in Breaker
See text for details of this test

the instrument. This is a mistake and should be corrected. To **reset an improperly timed gear** use the 3-in. screw driver and remove the setting screw on the top of the distributor housing. At the back of the housing and accessible between the magnets is a lock spring plate retained by two screws. **Loosen these screws and slip the plate to one side,** using the 6-in. screw driver. Use tips of blade and **push out distributor shaft. Remesh the gears correctly.** Indicating marks on the gears themselves make this easy. For clockwise rotation, bring together the punch mark on the lower gear and the tooth marked R on the upper gear. For an anti-clockwise magneto use the tooth marked L. In replacing distributor shaft hold down oil wick with tip of screw driver blade so shaft will clear easily. **Replace lock spring plate and set up screws.** This plate and method of clearing passage of shaft are shown in an accompanying illustration. **Replace setting screw.**

Broken Collector Ring Bush

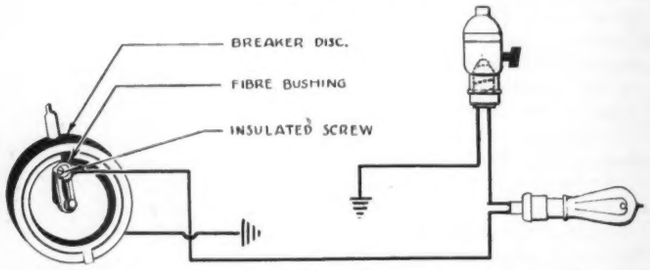
If the lower carbon brush in distributor plate be broken flush with plate, caused by careless removal of plate, do not attempt to pry it out. Strike the plate sharply on the heel of the hand and if this fails to jar the brush clear use compressed air, directing the blast at an angle. If it be necessary **to remove a brush** proceed as follows: **Pull out gently and straight, turning in a clockwise direction** at the same time, and replace in the same manner. These brushes have a coil spring and in replacing or removing the turning movement will avoid the possibility of jamming or injuring a spring. The brushes should extend about ¼ in.



Method of Removing Oldham Coupling From Driving End of Armature Shaft

Method of Testing Breaker Disc

There is a screw-head that is bushed with fiber to insulate it from the disc. If short circuited or grounded the lamps will light.



Proper Way to Remove Magnets

Statement is made by the service head of the factory that much of the reported magneto trouble is due to improper removal and replacement of the magnets. **The proper way is to remove or put back both magnets at the same time** and to avoid sliding one on or past the other. When one at a time is removed or slid past the other, that is, across the face, demagnetization takes place. An accompanying illustration shows very clearly the right and wrong way. **A keeper should always be placed across a magnet removed** and the two North poles should always be on the same side of the magneto in replacing.

Removal of Coupling

Inasmuch as the armature of the magneto is mounted on ball bearings and these are not constructed to withstand hammer blows, care should be exercised when **displacing a coupling from the shaft.** A simple method is to clamp a piece of stock in a vise and rest the coupling on it. Place a piece of square stock at an angle of about 180 degrees and tap with a hammer, which will start the coupling off and in the direction indicated by the arrow in the accompanying sketch.

Statement is made that it is possible for a magneto to fail to deliver its maximum spark when on the engine, but test 100 per cent. when removed. An accompanying sketch depicts conditions that may exist and represents a construction said to be very prevalent on truck engines, particularly since the war shortage of brass products. It is a well-known fact that **magnetos when mounted on an iron base or the mounting parts are not constructed of a non-magnetic material,** that their **magnets will be weakened.** If the base be of iron or steel the parts A, B and C should be brass, otherwise magnetic leakage will occur at points L.

Spare Parts to Stock

Truck dealers maintaining repair shops are warranted in stocking certain spare magneto parts provided a factory branch or factory appointed service station is not within a reasonable distance. **Use of parts other than those produced by the maker of the magneto should be avoided.** The following parts are recommended by the Eisemann Magneto Corp.:

One No. 13654 breaker disc, complete.

One No. 13536 platinum lever for breaker.

One No. 6809 platinum screw for breaker.

Ten No. 9462 carbon brushes for distributor plate at distributor disc.

Two No. 9463 carbon brushes for distributor plate at slip ring.

Two No. 9769 ground brushes in magneto housing.

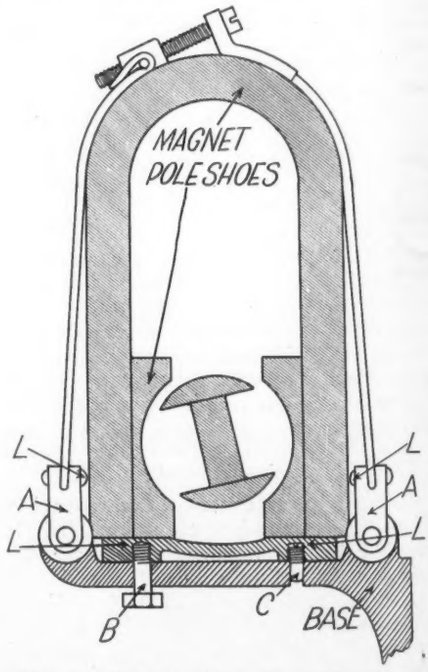
Two No. 9132 ground brushes in breaker.

One No. 13525 end cap for timing lever.

One No. 3790 fastening screw for breaker.

One No. 9464 distributor plate.

The stocking of these parts does not involve any great expense and will afford service to the truck owner.



Showing Danger of Iron Base Mounting
If base is iron or steel, the parts "A" "B" and "C" must be of brass, otherwise magnetic leakage will occur at points "L".

KEY OF ABBREVIATIONS

Used in the Specifications of Commercial Cars Listed on the Pages Following

In all specifications: { O—Own / Q—Optional

Engine:
Cont—Continental
Her—Hercules
H-Sp—Herschell-Spillman
Lyco—Lycoming
Ster—Sterling
Vict—Victory
Wau—Waukesha
Wis—Wisconsin

Valve Location:
L—ELL-Head
T—TEE-Head
O—Overhead

How Cooled:
C—Centrifugal Pump
G—Gear Pump
P—Water Pump
T—Thermo-Syphon

Radiator (Make or Type):
Bus—Bush
Can—Candler
EM—English-Mersick
Eur—Eureka
Fed—Fedders
Flex—Flexo
GO—G. & O.
Idl—Ideal
Lng—Long
McC—McCord
May—Mayo
Per—Perfex
R-T—Rome-Turney
Spi—Spirex
Stan—Standard
C—Cellular
T—Tubular
H—Honeycomb

Size of Tires:
*—Pneumatic
†—Dual

Lubrication:
C—Centrifugal Pump
F—Force Feed
G—Force and Gravity
B—Force and Splash
P—Water Pump

Carburetor:
B&B—Ball & Ball
Cart—Carter
Flch—Flechter
Holl—Holley
John—Johnson
Mar—Marvel
Mas—Master
Mill—Miller
Strm—Stromberg
Shk—Shakespeare
Sheb—Schebler
Till—Tillotson
Zen—Zenith

Fuel Feed:
G—Gravity
P—Pressure
V—Vacuum

Ignition System:
AtK—Atwater Kent
AuL—Auto-Lite
Bat—Battery
Bos—Bosch
Ber—Berling
Con—Connecticut
Del—Delco
Eis—Eisemann
Kin—Kingston
Mag—Magneto
NE—North East
POL—Prest-O-Lite
Sim—Simms
Spl—Splitdorf

Engine Starter:
L—Auto-Lite
B—Bijur
D—Dyneto
G—Gray & Davis
E—Leece-Neville
N—North East
W—Westinghouse

Clutch:
B—Borg & Beck
C—Cone
D—Disc
F—Fuller
G—Detroit Gear & Mach.
H—Hartford
L—Brown-Lipe
M—Merchant & Evans (Hele-Shaw)
U—Muncie
W—Warner
O—Own

Transmission:
B-Li—Brown-Lipe
Cott—Cotta
Covt—Covert
D-Sea—Driggs-Seabury
Det—Detroit
Durst—Durston
Full—Fuller
G-Lee—Grant Lees
MM—Mechanics Mach. Co.
Munc—Muncie
Plan—Planetary
Rock—Rockford
Selec—Selective
Warn—Warner

Location of Transmission:
A—Amidships
R—Rear
U—Unit with motor

Final Drive:
B—Bevel Gear
C—Chain
N—Concentric Spur
F—Friction
I—Internal Gear
S—Spiral Bevel
P—Spur
W—Worm
R—Double Reduction

Universal:
Arv—Arvac
Bld—Blood Brothers
Flex—Flexite
Hart—Hartford
K-B—Kinsler-Bennett
M—Merchant & Evans
Pet—Peters
Spic—Spicer
Ster—Sterling
Ther—Thermoid
UM—Universal Machine
UP—Universal Products

Rear Axle:
Cel—Celfor
Chi—Chicago
Cl—Clark
Emp—Empire
Rock—Rockford
Russ—Russel
Sals—Salisbury
Shel—Sheldon
Stan—Stan-Par
Tim—Timken
Torb—Torbensen
W-M—Weston-Mott
Flot—Floating
½-Fl—Semi-Floating
¾-Fl—¾ Floating

Springs:
Det—Detroit
GC—Garden City
Kal—Kalamazoo
Mar—Maremont
Math—Mather
Mer—Merrill
Nat—National
Per—Perfection
Row—Rowland
Shel—Sheldon
SP—Spring Perch
Stan—Standard Parts
Ster—Sterling
Tut—Tuthill
US—United States
Cant—Cantilever
Elip—Full Eliptic
S-El—Semi-Elliptic
¾-El—¾-Elliptic
S&C—Semi and Cantilever
S&¾—Semi and ¾-Elliptic

Steering Gear:
CAS—C. A. S. Products Co
Dit—Ditwiler
Gem—Gemmer
Jac—Jacox
Lav—Lavine
W—Worm
Warn—Warner
Wohl—Wohlrab

Governor:
C—Centrifugal
Cont—Continental
Del—Delaney
Dup—Duplex
Mer—Merrill
Mon—Monarch
Pier—Pierce
Rug—Ruggles
Simp—Simplex
Wau—Waukesha

Wheels:
Arc—Archibald
AuW—Auto Wheel
Bim—Bimel
Cla—Clark
Day—Dayton
Det—Detroit
E&O—Eberly & Oris
Hay—Hayes
Hoo—Hoopes Brothers
Jon—Jones
Kel—Kelsey
Mil—Military
Pru—Prudden
Roy—Royer
Sal—Salisbury
Sch—Schwartz
Smi—Smith
Sta—Stanwell
StM—St. Mary
Stn—Standard
Wan—Wayne

Rim Equipment:
Bak—Baker
Det—Detroit
Fir—Firestone
Gdy—Goodyear
Jax—Jaxon
Kel—Kelsey
Stn—Standard

In Electrics

Battery:
Exid—Exide
Edis—Edison
Phil—Philadelphia

Motor:
Gn-El—General Electric
West—Westinghouse

Controller:
Gn-El—General Electric
West—Westinghouse

Commercial Car Specifications—Corrected Monthly

The Specification, Chassis Prices, Etc., Are Corrected Each Month From Data Supplied Direct by the Makers. Gasoline Tractor-Trucks and Electric Commercial Cars Will be Found at the End of Gasoline Commercial Cars

(Where prices are not given they may be had on application to the manufacturer)

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Location	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
800 Pounds																															
Overland	1777	900	Own	3⅜x5	18.2	L	T	C	B	Till	...	Con	L	C	Selec	3	....	Own	B	¾-Fl	.....	.....	S&C	31x4*	31x4*	Own	104	.....	.....	.....	63.8
Pony	800	320	Own	2¾x4	12.1	L	T	H	B	Strm	G	AtK	...	...	Fric	3	....	Dead	C	O	4.25:1	12.25:1	Tut	28x3	28x3	Own	92	.....	Pru	.....	60
1000 Pounds																															
Corliss 1919	1450	715	LeRoi	3½x4½	15.6	...	..	T	B	Sheb	...	Dix	C	B	Covt	3	....	Arv	B	½-Fl	.....	.....	Har	31x4*	31x4*	Wohl	103	.....	.....	.....	80
Dodge	1975	1010	Own	3⅞x4½	24.1	L	C	T	B	Stew	V	Own	N	D	Selec	3	U	Own	S	Flot	4.16:1	19.44:1	Det	33x4	33x4	Own	114	.....	Own	Own	41
Ellsworth 25A	2100	....	Lyco	3¼x5	16.9	L	T	T	S	Cart	G	Con	A	C	GLee	3	U	Stan	B	Gem	4.75:1	16:1	Shel	30x3½*	30x3½*	Fos	108	.....	Sal	Det	70
Indiana 12	3800	2150	Wau	3¾x5¼	22.5	L	C	T	F	Strm	...	Eis	...	B	Selec	3	....	Acme	W	½-Fl	.....	.....	S-El	34x3½	34x5	Wohl	135	Wau	.....	.....	65
Vim 27	1900	1095	Own	3 x4½	14.4	L	T	McC	C	Zen	G	Atk	...	C	Selec	3	....	Spic	W	Shel	5.25:1	8.61:	Shel	31x4*	31x4*	Jac	108	.....	Hoo	Fir	....
1200 Pounds																															
Overland	2179	....	Own	4⅛x4½	27.2	L	T	C	B	Till	...	Con	L	C	Selec	3	....	Own	S	¾-Fl	.....	.....	S-El	33x4½*	33x4½*	Own	106	.....	.....	.....	68.8
1500 Pounds																															
Atlas 19	2320	1260	Lyco	3½x5	19.6	L	T	H	S	Cart	...	Rem	R	B	Selec	3	....	Arv	B	Hess	.....	.....	Row	32x4*	32x4*	CAS	118	.....	.....	.....	60
Belmont	....	750	.....	3½x5	19.6	...	T	.....	.....	.....	.....	.....	...	D	Selec	..	....	.....	...	½-Fl	.....	.....	S-El	30x3½	30x3½	.....	110	.....	.....	.....	....
Diehl A	2400	1575	Cont	3½x5	19.6	...	T	H	B	Zen	G	Bos	...	B	Durst	3	....	K-B	I	Torb	5.33:1	3.5:1	Mar	34x4½*	35x5*	Jac	115	.....	Sch	Fir	90
Dispatch G	2200	1200	Wis	3¾x5	22.5	L	T	C	F	Rayf	...	Bos	U	O	Own	4	....	Bld	C	Dead	.....	.....	Tut	34x4*	34x4*	W	120	.....	.....	.....	50
G.M.C. 16	2940	1495	Cont	3¾x5	22.5	L	W	McC	B	Mar	G	Eis	...	D	Selec	3	....	UM	B	WM	6:1	21.9:1	Det	35x5*	35x5*	Jac	132	Mon	.....	Bak	67
Grant 12	2300	1125	H-Sp	3¼x5	16.9	L	T	Fed	B	Cart	V	Spl	B	B	GLee	3	....	Arv	I	Torb	5.33:1	.....	Per	32x4*	32x4*	Dit	115	.....	Bim	Fir	58
International H	2800	1550	Own	3½x5¼	19.6	L	C	Own	B	Holl	...	Bos	O	D	Own	3	....	Own	I	Own	.....	.....	.....	36x3	36x3½	Ross	115	Own	.....	.....	50
Old Hickory M	2100	995	Lyco	3¼x5	16.9	L	T	C	S	Cart	G	Cov	D	C	Selec	3	U	Own	B	½-Fl	6:1	18:1	.....	33x4*	33x4*	W	112	.....	Sal	Sta	60
Oldsmobile	2324	1250	Own	3 11/16x5¼	21.7	O	C	Own	B	Zen	V	AuL	L	C	Selec	3	U	Hart	I	Torb	6.5:1	38.87:1	S-El	35x5	35x5	W	128	.....	AuW	Jax	70
Rainier R11	2350	1750	Cont	3½x5	19.6	L	T	Har	...	Zen	V	Sim	...	D	B-Li	3	....	Hart	W	Timk	7.2:1	23.9:1	Per	34x4½	34x4½	Lav	125	Mon	Sch	Fir	80
Reo F	2525	1285	Own	4⅛x4½	27.2	L	C	Own	S	John	G	Rem	R	O	Own	3	....	Own	B	Own	4.6:1	17.2:1	Penn	34x4½*	34x4½*	Own	128	.....	Pru	Fir	62.5
Shaw M-2	....	1900	Cont	3¾x5	22.5	L	T	T	B	Zen	...	Bos	...	D	B-Li	3	....	Spic	G	Timk	.....	.....	Per	32x4*	32x4*	Gem	116	.....	.....	.....	65
Stewart 11	2400	1195	LeRoi	3⅛x4½	15.6	R	T	C	B	Zen	...	Eis	...	B	Durst	3	....	Hart	I	Own	.....	.....	Det	32x4	32x4	CAS	110	LRoi	.....	.....	66.7
Texan A38	2500	1340	Lyco	3½x5	19.6	L	T	H	B	Cart	...	Del	D	B	Munc	3	....	UP	B	Flot	.....	.....	Cant	33x4	33x4	CAS	112	.....	.....	.....	60
Vim 28	2450	1350	Own	3 x4½	14.4	L	T	McC	C	Zen	G	AtK	...	C	Selec	3	....	Spic	W	Shel	5.25:1	8.6:1	Shel	32x4½*	32x4½*	Jac	127	.....	Hoo	Fir	....
White 15	2960	2400	Own	3¾x5⅛	22.5	L	C	C	B	Own	G	Mag	...	D	Selec	4	A	Own	B	Own	.....	.....	.....	34x4½*	34x4½*	Own	133	.....	.....	Fir	....
1 Ton																															
Acason R	3650	2100	Wau	3¾x4¼	22.5	L	P	Can	S	Sheb	G	Eis	...	F	Full	3	....	Bld	W	Timk	8.25:1	9.25:1	Det	36x3½	36x5	Ross	142	Wau	Bim	.....	73
Acme B	3376	2075	Cont	3¾x5	22.5	L	T	GO	B	Rayf	V	Eis	G	B	Cott	3	....	Bld	W	Timk	7.75:1	31:1	Det	34x3½	34x5	Ross	130	Dup	Hay	SAE	80
All-American A	2600	1295	H-Sp	3¼x5	16.9	L	T	Stan	B	Strm	G	Sim	...	B	GLee	3	....	UP	I	Torb	6:1	18:1	Det	33x4*	32x4	Ross	130	Pier	Stn	Gyd	75
Apex C	2870	1395	Buda	3½x5⅛	19.6	L	T	Can	P	Strm	V	AuL	Q	F	Full	3	U	UP	I	Torb	6.5:1	19.5:1	Det	33x4*	32x3½	Lav	130	.....	.....	Fir	70
Beck-Hawkeye A	2800	1500	Cont	3½x5	19.6	...	T	Har	S	Strm	G	Bos	...	F	Full	3	....	Bld	I	½-Fl	6:1	2.5:1	Hig	34x3	34x4	Lav	124	Pier	Hay	Fir	75
Bessemer G	2900	1600	Cont	3½x5	19.6	L	T	C	B	Zen	...	Bos	...	F	Full	3	....	Arv	I	Torb	.....	.....	Per	34x3½	34x4	Ross	124	.....	.....	.....	57
Briscoe T34	.....	....	Own	3¾x5	18.2	L	T	C	B	Buic	...	Bat	L	C	Own	3	....	UM	I	Russ	.....	.....	.....	33x4	34x3½	Lav	121	.....	.....	.....	....
Chevrolet T	2840	1325	Own	3 11/16x5¼	21.7	O	C	Har	B	Zen	...	Rem	L	C	Warn	3	....	Arv	W	½-Fl	.....	.....	Hess	33x4*	35x4*	Warn	125	Mon	.....	.....	....
Chicago C-1	2000	2200	Cont	3½x5	19.6	L	..	T	B	Zen	G	Bos	...	L	B-Li	3	U	Peters	W	Timk	7.75:1	25.8:1	Math	36x3	36x4	Gem	132	Pier	Q	Stn	....
Clydesdale 32X	3400	2185	Cont	3¾x5	22.5	L	T	T	S	Zen	G	Bos	...	L	B-Li	3	....	Spic	W	Stan	7.5:1	24:1	Stan	34x3½	34x5	Ross	144	Own	.....	.....	72
Columbia F	2800	1750	Cont	3¾x5	22.5	L	C	T	B	Shk	...	Dix	...	B	Covt	3	....	Soic	I	Russ	.....	.....	Per	34x3½	34x5	Own	125	Pier	.....	.....	70
Commerce E	2900	1590	Cont	3¾x5	22.5	L	T	L	S	Zen	V	Eis	I	C	Selec	3	....	Spic	I	Torb	7:1	22.9:1	Det	35x5	35x5	Jac	126	.....	Bim	Fir	80
Conestoga 20	3300	2100	Cont	3½x5	19.6	L	T	EM	S	Strm	G	Sim	...	F	Full	3	U	Ster	W	Wis	7.75:1	23:1	S-El	34x3½	34x5	Ross	128	.....	E&O	Stn	90
Corbitt E	3250	2200	Cont	3¾x5	22.5	L	T	McC	B	Strm	V	Eis	...	D	B-Li	3	U	Hart	W	Shel	6.5:1	19.5:1	Shel	34x3½	34x4	Ross	130	Simp	Bim	Fir	75
Dart E	3200	2100	Buda	3¾x5½	22.5	L	T	C	S	Zen	V	Eis	...	F	Full	3	U	Arv	W	Timk	7:1	20.3:1	Per	34x3½	34x5	Ross	130	.....	Pru	.....	80
Day-Elder A	3000	1775	Cont	3½x5	19.6	L	T	Bus	B	Zen	G	Eis	...	D	Covt	3	U	Hart	W	Wis	14.7:1	28.3:1	Shel	34x3	34x4	Ross	128	.....	Jon	Stn	70
Dearborn C	2100	1500	.....	3¾x4¼	22.5	L	T	H	S	Strm	G	Dix	...	...	GLee	3	U	.....	I	Torb	6.5:1	19.5:1	C-C	31x4*	35x5*	Dit	125	.....	.....	.....	90
Denby 12	3100	1950	Cont	3½x5	19.6	R	T	L	B	Strm	G	Eis	...	F	Full	3	U	UP	I	Russ	8.2:1	26.2:1	Det	34x3	34x4	Ross	124	Mon	.....	.....	73
Diamond T-J5	3275	2360	.....	3½x5	19.6	L	T	T	B	Strm	G	Bos	...	L	.....	3	U	Spic	W	.....	7.75:1	25.8:1	Math	36x3	36x4	.....	132	Pier	.....	.....	....
Douglas C	2750	1700	Buda	3½x5⅛	19.6	L	T	Own	B	Sheb	...	Eis	...	F	Full	3	....	Arv	I	Torb	.....	.....	Own	34x4½	35x5	Ross	122	.....	.....	.....	65
Famous B-10	3000	1690	Cont	3½x5	19.6	L	T	T	S	Strm	V	Eis	...	F	Full	3	U	Bear	I	Cl	7:1	21:1	Det	36x3½	36x4	Ross	120	Mon	Bim	.....	75
Federal SD	3600	2300	Cont	3¾x5	22.5	R	C	T	F	Zen	V	Eis	...	B	Own	3	A	Pet	W	Timk	6.2:1	20.6:1	Math	35x5*	36x6*	Gem	132	Phar	Det	Det	71
Ford T	1450	550	Own	3¾x4	22.5	L	T	S	Own	G	Mag	...	D	Plan	2	U	Own	W	½-Fl	7.25:1	.....	.....	.....	30x3½*	32x4½*	.....	124	.....	.....	.....	....
Forschler A	3450	2100	Cont	3½x5	19.6	L	C	Own	B	Zen	...	Bos	Q	F	Full	3	....	Hart	W	Shel	.....	.....	Own	34x3	34x4	Ross	120	Dup	.....	.....	....
Gary F	3200	1900	Buda	3¾x5	22.5	...	C	T	F	Mas	G	Eis	...	F	Full	3	U	Bld	W	Timk	7.2:1	21.6:1	S-El	36x3½	36x4	Lav	130	Pier	Pru	Gdy	....
Giant 15	2950	1950	Cont	3½x5	19.6	L	T	Idl	B	Sheb	...	Eis	...	W	Warn	3	....	Spic	W	Timk	.....	.....	Math	34x3½	34x5	Jac	138	.....	.....	.....	64

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Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Location	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
1½ Ton—Continued																															
Kleiber A.	....	2800	Cont	4 1/8x5 1/4	27.2	...	..	.....	...	Strm	...	Bos	...	..	B-Li	..	...	.....	W	.....	.....	.....	.....	36x3½	36x6	Ross	143	.....	.....	.....	....
Larrabee-Deyo U.	3600	2150	Cont	3¾x5	22.5	L	C	Bus	S	Sheb	G	Bos	...	L	B-Li	3	A	M	W	Shei	7.66:1	25.5:1	Mer	34x3½	34x5	Ross	138	Pier	Hoo	.....	....
Maccar L.	4450	2750	Cont	4 1/8x5 1/4	27.2	L	C	Own	B	Strm	G	Bos	...	L	B-Li	3	U	Spic	W	Timk	7:1	23.52:1	Mer	36x4	36x5	Ross	150	Pier	Sch	Gdy	70
Mack AB-1½	4800	3000	Own	4 x5	25.6	L	C	Own	S	Zen	...	Dix	Q	L	B-Li	4	....	Bld	C	Dead	.....	.....	Mer	36x4	36x3½†	Own	162	Own	.....	.....	75
Mack AB Worm.	4900	3000	Own	4x 5	25.6	L	C	C	S	Zen	...	Dix	Q	L	B-Li	4	....	Spic	W	Timk	.....	.....	Mer	36x4	36x3½†	Own	162	Own	.....	.....	75
Master Junior JW.	3800	2290	Buda	4 1/8x5½	27.2	L	C	T	S	Mas	G	Eis	...	D	Full	3	U	Arv	W	Timk	7.75:1	23.25:1	Det	34x3½	34x5	Ross	142	McC	Pru	.....	78
Master Junior JI.	3900	2190	Buda	4 1/8x5½	27.2	L	C	T	S	Mas	G	Eis	...	D	Full	3	U	Arv	I	Torb	8:1	24:1	Drt	34x3½	34x5	Ross	142	McC	Pru	.....	87
Maxwell.	2385	1185	Own	3 5/8x4½	21	L	T	T	B	John	G	AtK	...	C	Selec	3	U	Own	W	½-Fl	7.25:1	34.4:1	32x3	Shel	32x4	Own	124	.....	Kil	Kil	50
Menominee H.	....	2475	Cont	3¾x5¼	22.5	L	C	C	S	Strm	G	Eis	...	F	Selec	3	U	Spic	W	Timk	7:1	23.3:1	Tut	36x3½	36x5	Ross	144	Mon	Stn	Fir	80
Moreland 19B.	4150	2930	Cont	4 1/8x5 1/4	27.2	L	C	C	F	Mill	G	Dix	...	D	Selec	4	A	Ther	W	Timk	7:1	33.88:1	US	36x3½	36x5	Ross	126	.....	Smi	SAE	....
Myers 80.	3000	1875	Lyco	3½x5	19.6	L	C	T	S	Zen	G	Swi	...	B	GLee	3	U	UM	W	Chic	8.5:1	32:1	C-C	34x3½	34x5	CAS	144	.....	E&O	.....	75
Napoleon 11	3450	1660	Vict	3½x5	'9.6	O	C	T	F	Strm	G	Con	L	F	Full	3	U	UP	I	Cl	8:1	24:1	S-El	35x5*	36x6*	Lav	133	.....	.....	Fir	65
Nelson & LeMoon F1½.	3400	2425	Cont	4 1/8x5 1/4	27.2	L	C	T	S	Strm	G	Bos	W	L	B-Li	3	U	Own	W	Timk	7:1	2:1	Tut	36x3½	36x6	Lav	...	Pier	Pru	Gdy	80
Noble NWI.	3950	2450	Cont	3¾x5	22.5	R	C	T	B	Strm	...	Eis	G	F	Full	3	....	Acme	W	Shel	.....	.....	Kal	36x3½	36x5	Ross	144	.....	.....	.....	80
Norwalk.	1850	1925	Lyco	3½x5	19.6	L	T	C	B	Zen	...	Del	...	B	GLee	3	....	UM	W	Stan	.....	.....	C-C	34x3½	34x5	CAS	130	.....	.....	.....	75
O.K. 1½ T.	3850	2450	Rut	4 1/8x5½	27.2	L	C	T	B	Cart	...	Dix	...	D	Selec	3	....	Hart	W	Stan	.....	.....	Tut	36x4	36x5	Ross	146	Pier	.....	.....	....
Old Reliable A.	4150	2350	Wis	4 x5	25.6	L	C	L	B	Strm	...	Bos	Q	M	B-Li	3	....	Spic	W	Shel	.....	.....	Shel	34x3½	36x6	Ross	138	Pier	.....	.....	83
Oneida B.	5280	2650	Cont	4 1/8x5 1/4	27.2	L	C	L	F	Stan	G	Bos	Q	M	Cott	3	A	Spic	W	Timk	9.25:1	37:1	Math	36x3½	36x6	Ross	144	Pier	.....	.....	....
Packard 1½E.	4670	3200	Own	4 x5½	25.6	L	C	T	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	6.25:1	28.7:1	.....	34x3½	34x3½†	Own	144	Own	.....	.....	46.2
Patriot Lincoln.	3400	2150	Cont	3¾x5	22.5	L	T	Own	B	Strm	V	Bos	...	D	Selec	3	A	Ther	I	.....	7.7:1	27.9:1	S-El	34x3½	34x5	W	135	Pier	.....	Gdy	75
Piedmont.	....	....	Lyco	3½x5	19.6	L	T	Stan	F	Cart	...	Bat	D	B	Selec	3	....	Hart	W	Emp	.....	.....	S-El	.....	.....	.....	140	.....	.....	.....	....
Pioneer N.	....	1990	Cont	3¾x5	22.5	...	C	.....	...	Strm	...	Bos	...	...	B-Li	3	.....	.....	W	Timk	.....	.....	.....	36x3½	36x5	.....	154	.....	.....	.....	....
Rainier R-6.	3100	1975	Cont	3½x5	19.6	L	T	Har	B	Zen	V	Sim	...	D	B-Li	3	U	Hart	W	Shel	7.8:1	25.97:1	Per	34x3	34x4	Lav	133	Mon	Sch	....	80
Reliance 10.	4500	2500	Buda	4 1/8x5½	27.2	L	C	H	B	Strm	G	Bos	...	F	Full	3	U	Hart	E	Dead	7.2:1	21.6:1	Shel	36x3½	36x5	Ross	150	Pier	Nan	Gdy	90
Republic 11X.	3365	1885	Cont	3¾x5	22.5	L	T	C	B	Strm	G	Eis	...	D	Full	3	U	Arv	I	Torb	8:1	23.09:1	S-El	36x6*	38x7*	Jac	144	Rug	Pru	Fir	....
Royal.	....	2800	Wis	3¾x5	22.5	...	C	T	...	Strm	...	Bos	Q	D	Own	..	....	Own	W	Timk	.....	.....	Mer	34x4	34x5	Ross	128	.....	.....	.....	67
Sandow CG.	3300	2090	Cont	3½x5	19.6	L	T	T	B	Strm	G	Eis	...	D	Full	3	U	UM	W	Shel	7.8:1	23:1	GC	34x3½	34x5	Ross	135	.....	Stn	.....	70
Schwartz.	3500	2175	Cont	3¾x5	22.5	L	T	Fed	B	Strm	...	Bos	...	L	B-Li	3	....	Hart	I	Torb	.....	.....	Row	34x3½	34x5	Ross	140	Pier	.....	.....	....
Schwartz B.	3500	2375	Cont	3¾x5	22.5	L	T	Fed	B	Strm	...	Bos	...	L	B-Li	3	....	Hart	I	Torb	.....	.....	Row	36x6*	36x6*	Ross	140	Pier	.....	.....	....
Selden 1½A.	3400	2185	Cont	3¾x5	22.5	L	T	Bus	B	Strm	G	Bos	...	L	B-Li	3	U	Spic	W	Timk	7.75:1	.....	Per	34x3½	34x5	Lav	140	Pier	Arc	Gdy	70
Service 31.	4500	2500	Buda	4 x5½	25.6	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	7.75:1	37.5:1	.....	36x3½	36x6	Ross	150	Simp	Bim	.....	65
Service 36.	4500	2930	Buda	4 1/4x5½	28.9	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	6.8:1	32.9:1	.....	36x6*	38x7*	Ross	150	Simp	Bim	.....	65
Signal H.	4675	2700	Cont	4 1/8x5 1/4	27.2	L	C	McC	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	9.25:1	4:1	Det	34x4	36x6	Ross	144	Pier	Hay	Gdy	80
Stewart 9.	3440	1975	Cont	3¾x5	22.5	R	T	T	B	Zen	...	Eis	...	F	Full	3	...	Hart	I	.....	.....	.....	Det	34x3½	34x4†	Gem	140	.....	.....	.....	70
Stoughton B.	.....	.....	.....	3¾x5 1/4	22.5	...	C	Own	C	Strm	G	Eis	...	D	B-Li	3	U	.....	W	Shel	7.8:1	.....	S-El	36x3½	36x5	.....	140	.....	Own	Gdy	....
Sullivan F.	3500	2350	Buda	3¾x4½	22.5	L	T	V	F	Strm	...	Bos	...	H	Covt	3	....	Hart	W	Timk	.....	.....	Mer	36x3½	36x5	Ross	129	.....	.....	.....	60
Texan TK39.	3200	1425	Lyco	3½x5	19.6	L	T	H	B	Cart	G	Del	D	B	Munc	3	U	UP	W	½-Fl	7.75:1	20.15:1	S-El	34x4	34x4	CAS	130	.....	.....	Fir	60
Tiffin GW.	3750	2300	Cont	4 1/8x5 1/4	27.2	L	C	V	B	Sheb	G	Bos	...	F	Full	3	U	Hart	W	Shel	7.75:1	23.25:1	Kal	36x3½	36x5	Ross	129	Pier	Smi	.....	....
Towers J1½.	3400	2600	Cont	4 1/8x5 1/4	27.2	L	C	T	S	Strm	...	Bos	...	F	Full	3	....	Spic	W	Timk	.....	.....	Det	35x5*	38x7*	Ross	142	Pier	.....	.....	70
Transport 30.	3450	2050	Cont	3¾x5	22.5	L	C	C	B	Strm	G	Eis	...	F	Full	3	U	Hart	I	Cl	7.6:1	22.8:1	Det	36x3½	36x5	Jac	140	Simp	.....	Fir	70
Triangle A.	3750	2185	Wau	3¾x5 1/4	22.5	L	C	Per	L	Strm	G	Eis	...	F	Full	3	U	UP	I	Cl	6.83:1	23:1	Det	34x3½	34x6	Gem	144	Wau	Roy	Fir	60
Triumph 1½.	4500	2350	Buda	3¾x5 1/8	22.5	...	C	H	S	Strm	V	Dix	...	B	Selec	3	U	Hart	...	Russ	.....	8:1	S-El	36x3½	36x6	Lav	140	Pier	Stn	Stn	78
United A.	....	2375	Buda	4¾x5½	36.1	L	C	V	F	.....	G	Eis	Q	L	Bi-L	3	U	Bld	I	Cl	7:1	.....	.....	34x3½	34x5	Ross	Q	Simp	Pru	Fir	80
U.S.N.	3800	1995	Cont	3¾x5	22.5	R	C	T	S	Strm	V	Eis	Q	D	B-Li	3	U	Opt	I	Cel	7.6:1	25.3:1	Shel	36x3½	36x5	Lav	144	Mon	Sch	.....	80
Velie 46.	3650	1925	Cont	3¾x5	22.5	L	C	T	B	Strm	G	Bos	...	B	Durst	3	U	Arv	I	Torb	8:1	31.2:1	Math	36x3½	36x5	Gem	133	Mon	Bim	Gdy	80
White Hickory H.	3975	2475	Cont	3¾x5	22.5	L	C	T	B	Strm	V	Eis	...	F	Full	3	U	Arv	W	Timk	8.5:1	25.5:1	Shel	36x3½	36x5	Ross	144	Simp	Bim	Fir	76
Wichita L.	3600	2350	Own	3½x5	19.6	L	T	Per	S	Strm	G	Bos	...	C	Covt	3	A	Own	W	Shel	7.75:1	3.65:1	.....	36x3½	36x5	Ross	144	.....	Bim	Fir	....
Winther 39.	3700	2150	Wis	3¾x5	22.5	L	P	T	G	Strm	...	Eis	B	F	Full	3	....	Arv	I	Cl	.....	.....	Har	34x3½	34x5	Lav	140	.....	.....	.....	70
Winther 430.	4100	2375	Wis	3¾x5	22.5	P	L	T	G	Strm	...	Eis	...	F	Full	3	....	Arv	I	Cl	.....	.....	Har	32x4	32x4	Lav	132	.....	.....	.....	70
Witt-Will W-DT19.	3550	2000	Cont	3¾x5 1/4	22.5	L	G	T	C	B	Zen	G	Eis	...	D	Selec	3	U	Spic	W	Timk	6:1	.....	.....	S-El	36x3	36x4	Ross	120	Pier	Arc	SAE	67
Wolverine C.	3400	2250	Cont	3¾x5	22.5	L	T	L	B	Strm	G	Mag	G	F	Selec	3	U	UP	I	Russ	8.2:1	32.8:1	Tut	34x3½	34x5	Gem	140	Mon	Hay	Gdy	77
2 Ton																															
Acme A.	4450	2875	Cont	4 1/8x5 1/4	27.2	L	C	GO	B	Rayf	V	Eis	...	B	Cott	3	U	Bld	W	Timk	8.5:1	34:1	Det	36x4	36x7	Ross	148	Dup	Hay	SAE	80
All-American B.	....	....	H-Sp	3½x5	19.6	L	T	Stan	B	Strm	...	Sim	...	F	Full	3	....	Hart	I	Torb	.....	.....	Det	34x4	34x6	Lav	144	.....	.....	.....	80
Armleder HW.	4550	....	Cont	4 1/8x5 1/4	27.2	L	C	T	F	Zen	G	Bos	...	D	B-Li	3	U	Opt	W	Timk	8.5:1	34:1	Math	36x4	36x7	Ross	Q	Mon	StM	.....	80
Autocar F.	3430	2300	Own 2	4¾x4½	18	L	C	V	S	Strm	...	Mag	...	D	Prog	3	.....	.....	R	Flot	.....	.....	.....	34x4	34x5	Own	97	.....	.....	.....	....
Autocar G.	3690	2400	Own 2	4¾x4½	18	L	C	V	S	Strm	...	Mag	...	D	Prog	3	.....	.....	R	Flot	.....	.....	.....	34x4	34x5	Own	120	.....	.....	.....	....
Available H2.	4500	....	Cont	4 1/8x5 1/4	27.2	L	C	V	B	Strm	G	Bos	...	L	B-Li	4	A	Spic	W	Timk	7.75:1	31:1	Tut	36x4	36x7	Ross	152	Pier	Sch	.....	....
Beck Hawkeye C.	4000	2350	Cont	4 1/8x5 1/4	27.2	...	P	H	F	Strm	G	Bos	...	F	Full	3	U	Bld	I	½-Fl	9:1	2:1	Hig	36x3½	36x6	Lav	144	Pier	Hay	Fir	70
Brockway K4.	4700	2950	Cont	4 1/8x5 1/4	27.2	L	C	Bus	F	Sheb	G	Eis	...	L	B-Li	3	A	Spic	W	Timk	8.5:'	34:1	Mer	36x4	36x7	Gem	Q	Mon	Hoo	.....	80
Columbia E.	4100	2350	Cont	4 1/8x5 1/4	27.2	L	C	T	F	Shk	...	Dix	...	C	Covt	3	....	Spic	I	Russ	.....	.....	Per	36x4	36x6	Own	144	Pier	.....	.....	80
Conestoga 30.	4000	2700	Cont	3¾x5	22.5	L	C	EM	S	Strm	G	Sim	...	F	Full	3	U	Ster	W	Wis	9.66:1	29:1	S-El	36x4	36x4†	Ross	138	.....	E&O	Stn	80
Corbitt C.	4800	3250	Cont	4 1/8x5 1/4	27.2	L	C	T	B	Strm	V	Eis	...	D	B-Li	3	U	Hart	W	Shel	8.75:1	29.4:1	Shel	36x3½	36x7	Ross	148	Simp	Bim	Fir	75
Day-Elder D.	3650	2450	Cont	4 1/8x5 1/4	27.2	L	P	Bus	F	Zen	G	Eis	...	D	Covt	3	U	Hart	W	Wis	15.4:1	35 4:1	Shel	36x4	36x6	Ross	144	Mon	Jon	Stn	72
Dearborn BW.	3000	2250	Buda	3¾x5 1/8	19.6	L	T	H	S	Strm	V	Bos	...	B	GLee	3	U	Arv	W	Stan	7.75:1	23.8:1	S-El	32x4*	34x5	Dit	133	.....	.....	.....	90
Defiance C.	3500	1995	Cont	3¾x5	22.5	R	T	Per	S	Strm	...	Eis	...	B	GLee	3	....	Arv	I	Torb	.....	.....	Det	34x3½	34x6	Dit	135	Mon	.....	.....	85
De Kalb E2.	4150	2100	Cont	4 1/8x5 1/4	27.2	L	P	T	F	Mas	G	Eis	...	F	Full	3	U	K-B	W	Timk	8.5:1	28:1	Math	34x3½	34x6	Ross	146	.....	Hay	.....	68
Denby 134.	3800	2450	Cont	3¾x5	22.5	R	T	L	S	Strm	G	Eis	...	F	Full	4	U	UP	I	Russ	10.2:1	49:1	Det	36x3½	36x6	Gem	144	Mon	.....	.....	75.5
Diamond T-J3.	4335	3185	.....	4 1/8x5 1/4	27.2	L	C	T	B	Strm	G	Bos	...	L	.....	4	U	Spic	W	.....	7.75:1	26.04:1	Math	36x4	36x7	.....	154	Pier	.....	.....	....
Diamond T-FS-T.	4000	2200	.....	3¾x5 1/4	22.5	L	C	T	B	Strm	G	Bos	...	L	.....	3	U	.....	W	.....	7.75:1	26.04:1	Math	36x3½	36x5	.....	144	Pier	.....	.....	....
Dorris K-4.	5200	3285	Own	4¼x5½	28.9	O	W	T	F	Strm	G	Bos	...	D	Warn	4	A	Spic	W	Timk	1:1	4.99:1	Row	36x4	36x7	Ross	162	Own	Bim	.....	70
Erie 2.	5100	....	Buda	4¼x5½	28.9	L	C	McC	B	Strm	...	Bos	...	D	Full	4	....	Spic	W	Shel	.....	.....	Per	34x3½	36x5	Ross	150	Pier	.....	.....	80
Fageol 3400.	4600	....	Wau	4¼x5¾	28.9	L	C	Spi	S	Zen	...	Dis	...	B	Selec	5	....	Spic	W	Timk	.....	.....	Math	34x4	36x7	Ross	144	Wau	.....	.....	80

2 Ton—Continued

Fargo P.	3900	2200	Cont	3¾x5	22.5	L	T	Own	S	Rayf	G	Bos	...	D	Full	4	U	Spic	I	Russ	9.5:1	.....	Shel	36x4	36x6	Jac	144	.....	.....	.....	80
Federal UE.	4900	2800	Cont	4 1/16x5 1/4	27.2	L	C	T	B	Zen	G	Eis	...	D	Own	4	A	Spic	W	Timk	9.25:1	40.7:1	Math	36x4	36x7	Gem	156	Phar	Sch	Fir	71.5
Forschler B.	4425	2750	Cont	4 1/16x5 1/4	27.2	L	C	O	B	Zen	...	Bos	Q	F	Full	3	....	Hart	W	Shel	.....	.....	Own	34x4	34x7	Ross	137	Dup	.....	.....	....
Gabriel E	5000	3250	Buda	4 1/4 x5 1/2	28.9	L	C	T	F	Rayf	...	Bcs	L	B	B-Li	4	....	Spic	W	Timk	.....	.....	Mer	35x5	36x7	Gem	156	Dup	.....	.....	65
Garford 70B	4350	2990	Buda	4 1/4 x5 1/2	28.9	L	C	T	S	Rayf	G	Spl	...	L	Selec	4	A	Spic	W	Timk	1:1	4.84:1	Per	36x4	36x7	Ross	144	Simp	.....	Gdy	....
Giant 16.	4500	2850	Cont	4 1/16x5 1/4	27.2	L	C	C	B	Sheb	...	Eis	...	W	Warn	3	....	Spic	W	Timk	.....	.....	Math	36x4	36x7	Jac	144	.....	.....	.....	90
G.M.C. 41A.	4855	2725	Cont	4 1/16x5 1/4	27.2	L	C	McC	B	Mar	G	Eis	...	D	Selec	4	U	UM	W	Timk	9.25:1	37.5:1	Det	36x4	36x7	Jac	144	Mon	Own	SAE	74
G.M.C. 41B.	4910	2725	Cont	4 1/16x5 1/2	27.2	L	C	McC	B	Mar	G	Eis	...	D	Selec	4	U	UM	W	Timk	9.25:1	37.5:1	Det	36x4	36x7	Jac	158	Mon	Own	SAE	74
Gramm-Bernstein 20.	4700	2900	Cont	4 1/16x5 1/4	27.2	R	C	T	S	Strm	G	NE	...	D	Own	3	A	Own	W	Shel	7.75:1	28:1	.....	36x4	36x7	Ross	144	Pier	.....	Fir	91
Grant 15.	3400	2150	Cont	3¾x5	22.5	L	T	Fed	B	Cart	V	Spl	R	B	GLee	3	U	Arv	I	Torb	8:1	.....	Per	34x4	34x6	Jac	124	Pier	Bim	.....	67
Grant 16.	3500	2250	Cont	3¾x5	22.5	L	T	Fed	B	Cart	V	Spl	R	B	GLee	3	U	Arv	I	Torb	8:1	.....	Per	34x4	34x6	Jac	149	Pier	Bim	.....	70
Hahn H.	4800	....	Cont	4 1/16x5 1/4	27.2	L	P	Own	F	Strm	...	Mag	...	D	B-Li	3	....	Spic	I	Torb	.....	.....	Del	34x3 1/2	34x6	Ross	136	Pier	.....	.....	....
Hahn E.	5000	....	Cont	4 1/16x5 1/2	32.4	L	C	Own	F	Strm	...	Bcs	...	D	B-Li	3	....	Spic	W	Timk	.....	.....	Del	36x4	36x7	Ross	Q	Pier	.....	.....	....
Hall.	4560	2875	Cont	4 1/16x5 1/4	27.2	L	P	H	B	Zen	G	Bcs	...	F	Full	4	....	Hart	I	Cl	.....	.....	Det	36x4	36x6	Ross	148	Simp	.....	.....	70
Hawkeye M.	4000	2650	Buda	4 1/4 x5 1/2	28.9	L	C	C	B	Zen	...	Eis	...	B	Cott	..	..	Spic	W	Wis	.....	.....	.....	36x4	36x6	Ross	140	.....	.....	.....	....
Hewitt-Ludlow.	4200	2950	Buda	4 1/16x5 1/2	27.2	..	..	T	..	Strm	...	Bos	...	B	Cott	..	..	Spic	W	Wis	.....	.....	.....	36x4	36x6	Ross	148	Dup	Wan	.....	....
Hurlburt.	5000	3750	Buda	4 1/4 x5 1/2	28.9	L	C	T	B	Flch	G	Eis	...	D	B-Li	3	U	Spic	W	Flot	8.66:1	29.09:1	Per	36x4	34x4†	Ross	140	.....	.....	.....	....
Indepen't F, Dav'n't, Ia.	4500	2290	Cont	4 1/16x5 1/4	27.2	L	C	C	B	Strm	V	Bos	...	F	Full	4	U	Bld	C	Dead	10.2:1	.....	G-C	36x6*	40x8*	Lav	146	.....	Pru	Fir	75
Indepen't G, Y'ngst'n, O.	3800	2300	Cont	4 1/16x5 1/4	27.2	L	C	C	B	Zen	...	Eis	...	F	Full	3	....	.....	W	Wis	.....	.....	S-El	34x3	34x6	Wohl	144	.....	.....	.....	70
Indiana 25.	5200	2950	Rut	4 1/16x5 1/4	27.2	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Acme	W	½-Fl	7.75:1	32.5:1	S-El	36x4	36x8	Wohl	150	Pier	Bim	.....	71.5
International G.	4010	2600	Own	4 x5	25.6	O	T	Own	B	Eis	...	Dix	O	D	Own	3	....	Own	I	Own	.....	.....	.....	36x4	36x6	Ross	138	Own	.....	.....	50
Kalamazoo H.	5350	3150	Cont 6	3 1/16x5 1/4	29.4	L	P	Hvn	B	Strm	...	Bos	D	B	Full	4	....	Acme	W	Wis	.....	.....	Shel	34x4	36x7	Ross	160	Pier	.....	.....	....
Keldon 19.	5100	2885	Buda	4 1/4 x5 1/2	28.9	L	C	Eur	F	Strm	G	Eis	...	F	Full	4	U	Det	I	Russ	1.75:1	3.75:1	.....	36x4	36x7	Ross	144	Pier	Smi	Fir	80
King Zeitler.	4600	2950	Cont	4 1/16x5 1/4	27.2	L	C	T	B	Strm	G	Bos	...	L	B-Li	4	A	Ther	W	Timk	7.75:1	37:1	Tut	36x4	36x7	Lav	150	.....	StM	SAE	80
Kissel Freighter.	4910	2975	Own	4 1/4 x5 1/2	28.9	L	C	McC	S	Strm	V	Eis	...	W	Warn	4	A	Spic	W	Timk	8.5:1	.....	Math	36x4	36x7	Lav	168	Pier	Pru	.....	80
Kleiber BB.	....	3200	Cont	4 1/16x5 1/4	27.2	..	..	..	..	Strm	...	Bos	...	..	B Li	..	..	.....	W	.....	.....	.....	.....	36x4	36x7	Ross	153	.....	.....	.....	....
Luedinghaus A.	4300	2490	Wau	4 1/4 x5 3/4	28.9	L	G	T	B	Sheb	...	Mag	...	G	Det	3	....	Spic	W	Chi	.....	.....	Tut	36x4	36x7	Lav	145	Wau	.....	.....	80
Lange B.	5200	2900	Cont	4 1/16x5 1/4	27.2	L	T	H	S	Strm	...	Bos	...	D	Cott	3	....	Hvn	C	Own	.....	.....	.....	36x4	36x6	Gem	136	Pier	.....	.....	90
Luverne BBL.	....	1650	GBS	3¾x4 1/4	22.5	L	T	C	S	Sheb	G	Bos	D	D	Det	3	U	UP	I	Flot	8:1	30:1	Har	34x4*	34x5	Lav	136	.....	Own	Fir	....
Mack AB.	4900	3300	Own	4 x5	25.6	L	C	C	S	Zen	...	Dix	Q	L	B-Li	4	....	Bld	C	Dead	.....	.....	Mer	36x4	36x3 1/2†	Own	162	Own	.....	.....	75
Mack AB-Worm.	5000	3300	Own	4 x5	25.6	L	C	C	S	Zen	...	Dix	Q	L	B-Li	4	....	Spic	W	Timk	.....	.....	Mer	36x4	36x4†	Own	162	Own	.....	.....	75
Master M.	4300	2590	Buda	4 1/4 x5 1/2	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Arv	I	Torb	8:1	32:1	Det	34x4	36x7	Ross	144	McC	Pru	.....	76
Master O.	4400	2690	Buda	4 1/4 x5 1/2	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Arv	I	Torb	8:1	32:1	Det	34x4	36x7	Ross	170	McC	Pru	.....	76
Master T.	4500	2850	Buda	4 1/4 x5 1/2	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Arv	I	Torb	8:1	32:1	Det	34x4	36x4*	Ross	110	McC	Pru	.....	76
Master W.	4500	2890	Buda	4 1/4 x5 1/2	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Arv	W	Timk	8.5:1	34:1	Det	34x4	36x7†	Ross	144	McC	Pru	.....	76
Master WL.	4600	2990	Buda	4 1/4 x5 1/2	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Arv	W	Timk	8.5:1	34:1	Det	34x4	34x7†	Ross	144	McC	Pru	.....	80
Menominee D.	....	2950	Cont	4 1/16x5 1/4	27.2	L	C	T	B	Strm	G	Eis	...	F	Full	4	U	Spic	W	Timk	9.25:1	40.08:1	Tut	36x4	36x4†	Ross	144	Mon	Stn	Fir	80
Muskegon 20.	4015	2325	Cont	4 1/16x5 1/4	27.2	L	C	M	B	Stew	...	Eis	...	F	Full	3	....	Hart	I	Torb	.....	.....	Per	36x4	36x6	Lav	144	Pier	.....	.....	75
Nash 3018.	3850	2250	Own	3¾x5 1/4	22.5	L	C	T	F	Strm	...	Eis	...	D	Selec	4	....	Own	I	Celf	.....	.....	Math	34x4	34x6	Lav	144	Simp	.....	.....	73.5
Nash Quad 4017.	6250	3250	Buda	4 1/4 x5 1/2	28.9	L	C	T	F	Strm	...	Eis	...	D	I-Cl	4	....	Spic	F	Own	.....	.....	Math	36x5	36x5	Lav	124	Mon	.....	.....	55
Nelson & LeMoon F2.	4100	2775	Cont	4 1/16x5 1/4	27.2	L	C	T	S	Strm	G	Bos	W	L	B-Li	3	U	Own	W	Timk	7.75:1	2:1	Tut	36x4	36x7	Lav	Q	Pier	Pru	Gdy	80
Netco D.	5900	3000	Cont	4 1/16x5 1/4	27.2	L	C	RT	S	Zen	G	Eis	...	L	B-Li	3	U	Hart	W	Timk	9.25:1	36:1	Per	36x4	36x7	Ross	144	.....	Arc	SAE	80
Northway B2.	....	.....	.....	4 x6	25	..	..	.....	..	.....	V	Mag	...	D	.....	..	U	.....	..	.....	7.75:1	37.2:1	S-El	36x6*	38x7*	Ross	146	.....	.....	.....	....
Northwestern WT.	4900	2950	Cont	4 1/16x5 1/4	27.2	L	C	MR	S	Strm	...	Bos	...	H	Selec	3	....	Bld	W	Shel	.....	.....	Shel	34x4	36x7	Ross	164	.....	.....	.....	80
Ogden B1.	4300	2695	Cont	4 1/16x5 1/4	27.2	L	C	T	B	Rayf	...	Bos	...	B	B-Li	4	....	Acme	W	Timk	.....	.....	Tut	36x4	36x7	Gem	160	Pier	.....	.....	70
O.K. 2T.	4000	2850	Buda	4 1/16x5 1/2	27.2	L	C	T	B	Zen	V	Eis	...	D	Selec	3	U	Hart	W	Wis	8.75:1	56.87:1	Tut	36x4	36x7	Ross	150	Pier	.....	SAE	85
Oneida C.	5440	3000	Cont	4 1/16x5 1/4	27.2	L	C	L	B	Strm	G	Bos	Q	M	Cott	3	A	Spic	W	Timk	9.25:1	37:1	Math	36x4	36x7	Ross	144	Pier	.....	.....	82.5
Oshkosh A4.	4200	3600	H-Sp	3¼x5	16.9	L	C	T	B	Zen	V	Bat	N	L	B-Li	4	U	Peters	B	Flot	8.25:1	33:1	Tut	36x6*	36x6*	Own	130	Dup	.....	Fir	60
Packard 2E.	5100	3600	Own	4 x5½	25.6	L	C	T	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	7.25:1	33.3:1	.....	34x4	34x4†	Own	144	Own	.....	.....	48.2
Parker F9C.	4500	3325	Cont 6	3 1/16x5 1/4	29.4	R	C	O	F	Strm	G	Bos	W	L	Full	4	A	Arv	W	Own	7.75:1	37.2:1	S-El	34x4	36x4†	Ross	150	Mon	Bim	.....	75
Parker F9W.	4500	3325	Wis	4 x6	25.6	R	C	O	F	Strm	G	Bos	W	L	Full	4	A	Arv	W	Own	7.75:1	37.2:1	S-El	34x4	34x6†	Ross	150	Mon	Bim	.....	80
Pierce-Arrow X4.	6250	4300	Own	4 x5½	25.6	T	P	O	T	F	Own	G	Eis	...	C	Selec	4	A	Own	W	Flot	7:1	37.08:1	S-El	36x4	36x4†	Own	150	Own	Own	Own	70
Pioneer F.	....	2390	Cont	4 1/16x5 1/4	27.3	..	C	..	..	Strm	..	Eis	...	..	B-Li	4	....	.....	W	Timk	.....	.....	.....	36x4	36x7	.....	164	.....	.....	.....	....
Rainier R8.	3600	2400	Cont	3¾x5	22.5	L	T	Har	B	Zen	V	Sim	...	D	B-Li	3	U	Hart	W	Shel	8.66:1	28.83:1	Per	34x4	34x6	Ross	147	Mon	Sch	.....	80
Rowe CDW.	4500	3000	Wis	4 x5	32	L	C	M	F	Zen	...	Bos	...	L	B-Li	4	....	Arv	W	Timk	.....	.....	Shel	34x4	34x4†	Ross	142	Simp	.....	.....	53
Royal.	....	3200	Wis	4 x5	25.6	..	C	T	..	Strm	...	Bos	Q	B	Own	..	..	Own	W	Timk	.....	.....	Mer	36x4 1/2	36x6	Ross	...	Mon	.....	.....	....
Sandow I.	3800	2375	Cont	3¾x5	22.5	L	P	T	B	Strm	G	Eis	...	D	Full	3	U	K-B	I	Torb	10:1	30:1	GC	36x4	36x6	Ross	150	.....	Pru	.....	70
Schacht.	5500	3350	Buda	4 1/4 x5 1/2	28.9	R	P	Own	F	Sheb	G	Bos	...	H	Own	3	A	Flex	W	Own	8.66:1	27.06:1	Nat	36x4	36x7	Own	144	Dup	StM	.....	70
Schwartz.	4000	2675	Cont	4 1/16x5 1/4	27.2	L	C	Fed	B	Strm	...	Bos	...	L	B-Li	3	....	Hart	I	Torb	.....	.....	.....	36x4	36x7	Ross	146	Pier	.....	.....	....
Selden JWBL.	5050	3050	Cont	4 1/16x5 1/4	27.2	L	C	Bus	B	Strm	G	Bos	...	L	B-Li	4	U	Spic	W	Timk	7.75:1	.....	Per	36x4	36x7	Jac	162	Pier	Arc	.....	70
Signal J.	5010	3100	Cont	4 1/16x5 1/4	27.2	L	C	McC	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	9.25:1	4:1	Det	34x4	36x8	Ross	150	Pier	Hay	Gdy	80
Standard 76.	4430	2800	Cont	4 1/16x5 1/4	27.2	L	C	T	B	Strm	G	Eis	...	D	B-Li	4	A	Spic	W	Timk	7.75:1	37.6:1	.....	36x4	36x6	Ross	140	.....	.....	.....	70
Stewart 7.	4460	2575	Cont	4 1/16x5 1/4	27.2	R	P	T	B	Zen	...	Eis	...	F	Full	3	....	Hart	I	Own	.....	.....	Det	34x4	34x4†	Ross	156	Pier	.....	.....	72
Stoughton D.	....	.....	.....	4 x5½	25.6	..	C	Own	C	Strm	G	Eis	...	D	B-Li	3	U	.....	W	Shel	7.8:1	.....	S-El	36x4	36x7	.....	140	.....	Own	Gdy	....
Sullivan E.	4500	2975	Buda	4 1/16x5 1/2	27.2	L	P	V	F	Strm	...	Bos	...	L	B-Li	3	....	Bld	W	Timk	.....	.....	Shel	36x4	36x7	Ross	150	.....	.....	.....	71
Sullivan EL.	4500	3050	Buda	4 1/16x5 1/2	27.2	L	P	V	F	Strm	...	Bos	...	L	B-Li	3	....	Spic	W	Timk	.....	.....	Shel	36x4	36x7	Ross	168	.....	.....	.....	71
Superior E.	3600	2275	Cont	4 1/16x5 1/4	27.2	L	P	I	F	Strm	...	Eis	...	F	Full	3	....	Bld	I	Torb	.....	.....	Tut	36x4	36x6	Ross	144	Pier	.....	.....	....
Traffic.	3175	1395	Cont	3¾x5	22.5	R	T	C	S	Cart	G	Bos	...	C	Covt	3	U	UM	I	Russ	8.2:1	22.96:1	Det	34x3 1/2	35x4	Dit	133	.....	Roy	Fir	70
Transport 50.	4285	2585	Cont	4 1/16x5 1/4	27.2	L	P	C	F	Strm	G	Eis	...	F	Full	4	U	Hart	I	Cl	8.15:1	39:1	Det	36x4	36x7	Jac	150	Dup	.....	Fir	70
Triumph 2.	4900	2850	Buda	3¾x5 1/8	22.5	..	C	H	S	Strm	..	Dix	...	B	Selec	3	....	Hart	I	Russ	.....	.....	S-El	36x3 1/2	36x6	Lav	144	Pier	.....	.....	78
Velie 25-B.	5100	2950	Cont	4 1/16x5 1/4	27.2	L	C	T	F	Strm	V	Bos	...	L	B-Li	4	A	Spic	W	Timk	7.75:1	31:1	Math	36x4	36x7	Gem	152	Pier	Bim	Gdy	80
Vim 22.	4500	3150	Her	3¾x5 1/8	22.5	L	C	McC	C	Zen	G	Dix	...	D	Selec	4	U	Spic	W	Shel	7.75:1	11.75:1	Shel	36x4	36x6	Gem	142	Dup	Smi	.....	....
Ward LaFrance 2A.	5260	3350	.....	4 1/16x5 1/4	27.2	L	G	O	S	Zen	G	Mag	...	B	B-Li	4	A	Spic	W	Timk	7.75:1	37.5:1	.....	36x4	36x7	Ross	154	Simp	.....	.....	85
White 20.	4150	3300	Own	3¾x5 1/8	22.5	L	C	C	E	Own	G	Mag	...	D	Selec	4	A	Own	R	Own	.....	.....	.....	36x4	36x7	Own	145	.....	.....	Fir	....
Wichita M.	4700	2750	Wau	3¾x5 1/4	22.5	L	P	Per	C	Strm	G	Bos	...	C	Covt	3	A	Own	W	Shel	10.66:1	3.65:1	.....	36x4	36x6	Ross	144	Wau	Bim	Fir	....
Wilson E.	4500	2950	Cont	4 1/16x5 1/4	27.2	L	C	T	B	Mar	G	Eis	...	C	Covt	3	A	K-B	W	Timk	8.6:1	31.3:1	Tut	36x4	36x7	Ross	144	Pier	.....	.....	80
Winther 49.	5300	3000	Wis	4 x6	25.6	L	P	T	G	Mas	...	Eis	B	F	Full	3	....	Bld	I	Cl	.....	.....	Math	34x4	36x4†	Ross	150	.....	.....	.....	80
Witt-Will WD2-19.	4550	2850	Cont	4 1/16x5 1/4	27.2	L	G	C	B	Zen	V	Eis	...	D	Selec	3	U	Spic	W	Timk	7.8:1	23.4:1	S-El	36x3 1/2	36x7	Ross	144	Pier	E&O	Fir	70

2½ Ton

Acason H.	4354	3150	Wau	4 1/4 x5 3/4	28.9	L	P	Can	S	Sheb	V	Eis	...	B	Cott	3	U	Bld	W	Timk	8.5:1	40.37:1	Det	36x4	36x7	Ross	150	Wau	Bim	.....	76
Ace.	5300	....	Buda	4 1/4 x5 1/2	28.9	L	C	Spi	F	Sheb	G	AtK	W	L	B-Li	4	A	Spic	W	Timk	7.75:1	31:1	Math	36x4	36x7	Ross	156	Pier	Day	.....	....
Apex E.	4500	2450	Buda	4 1/4 x5 1/2	28.9	L	C	Can	P	Strm	V	Eis	Q	F	Full	3	U	UP	I	Torb	9:1	27:1	Det	36x4	36x6	Lav	150	Dup	.....	Fir	70
Atterbury 7C-XLWB	5325	3275	Cont	4 1/16x5 1/4	27.2	L	C	T	S	Zen	G	Eis	L	B	B-Li	4	U	Spic	W	Timk	9.25:1	37:1	SP	36x4	36x4†	Gem	171	Mon	Arc	Fir	92.5
Atterbury 7C-XSTD.	5260	3175	Cont	4 1/8x5 1/4	27.2	L	C	T	S	Zen	G	Eis	L	L	B-Li	4	U	Spic	W	Timk	9.25:1	37:1	SP	36x4	36x7	Gem	153	Mon	Arc	Fir	92.5

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Location	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
2½ Ton—Continued																															
Available H2½	5000	....	Cont	4 1/8x5 1/4	27.2	L	C	T	B	Strm	G	Bos	...	L	B-Li	4	A	Spic	W	Wis	8.66:1	34.66:1	Tut	36x4	36x8	Ross	152	Pier	Sch	.....	....
Beck-Hawkeye D	5000	2850	Cont	4 1/8x5 1/4	27.2	...	P	H	F	Strm	G	Bos	...	F	Full	3	U	Bld	I	½-Fl	9:1	2:1	Hig	36x4	36x7	Lav	160	Pier	Hay	Fir	70
Bessemer J-2	4500	2785	Cont	4 1/8x5 1/4	27.2	L	C	C	B	Rayf	...	Bos	...	B	B-Li	4	....	Arv	I	Torb	.....	.....	Per	36x4	36x4†	Ross	158	Pier	.....	.....	67
Bethlehem E	3910	2365	Own	4 x4 1/2	25.6	L	T	Fed	B	Sheb	G	Will	G	B	Det	3	U	UP	I	Russ	8,8:1	28.16:1	Shel	34x4	34x6	Lav	144	Mon	Wan	Fir	85
Bets D2	4750	2785	Buda	4 1/4 x5 1/2	28.9	L	C	T	F	Strm	...	Bos	...	L	B-Li	4	....	UM	W	Timk	.....	.....	Tut	36x4	36x7	Ross	150	Pier	.....	.....	75
Brinton F	4500	3000	Cont	4 1/8x5 1/4	27.2	L	T	T	F	Strm	G	Bos	...	D	Selec	3	U	Spic	W	Flot	1:1	3.36:1	.....	36x4	36x6	Ross	Q	Pier	Sch	.....	....
Chicago C2½	4500	3000	Cont	4 1/8x5 1/4	27.2	L	..	T	B	Zen	G	Bos	...	L	B-Li	4	U	Peters	W	Timk	8.5:1	34:1	Math	36x4	36x7	Ross	180	Pier	Q	Stn	....
Clydesdale 65X	4850	3175	Cont	4 1/8x5 1/4	27.2	L	C	T	S	Zen	G	Bos	...	L	B-Li	4	A	Spic	W	Timk	8.5:1	34:1	Stan	36x4	36x4†	Gem	163	Own	Smi	.....	73
Concord B	4600	3200	Buda	4 1/4 x5 1/2	28.9	L	C	T	S	Zen	...	Eis	...	L	B Li	4	...	Spic	W	Timk	.....	.....	Per	36x4	36x4†	Ross	150	Mon	.....	.....	70
Corbitt B	5000	3500	Cont	4 1/8x5 1/4	27.2	L	C	T	B	Strm	V	Eis	...	D	B-Li	3	U	Hart	W	Shel	8.75:1	35:1	Shel	36x4	36x7	Ross	148	Simp	Bim	Fir	75
Dart CC	4785	2950	Buda	4 1/4 x5 1/2	28.9	L	C	C	F	Zen	G	Eis	...	F	Full	4	U	Spic	W	Timk	8.5:1	38:1	Per	36x4	36x7	Ross	150	Simp	Pru	.....	80
Day-Elder C	4600	2750	Buda	4 1/4 x5 1/2	28.9	L	P	Bus	B	Zen	G	Eis	...	D	Covt	3	U	Hart	W	Wis	13.8:1	31.7:1	Shel	36x4	36x7	Ross	150	Mon	Jon	.....	72
DeKalb E2½	4800	2600	Cont	4 1/8x5 1/4	27.2	L	P	T	F	Mas	G	Eis	...	F	Full	3	U	K-B	W	Flot	9.33:1	33:1	Math	36x5	36x6	Ross	144	.....	Hay	.....	71
Denby 25	4790	3250	Cont	4 1/8x5 1/4	27.2	R	C	L	B	Strm	G	Eis	...	F	Full	4	....	UP	I	Russ	10.9:1	52.3:1	Det	36x4	36x7	Gem	150	Mon	Sim	.....	79
Doane 1919	5000	3750	Wau	4 1/4 x5 3/4	28.9	...	C	C	S	Mas	...	Bos	...	D	Selec	4	....	D	C	Dead	.....	.....	.....	36x5	36x7	Lav	156	Wau	.....	.....	79
Douglas E	4500	2525	Buda	4 1/4 x5 1/2	28.9	L	C	Own	F	Sheb	...	Eis	...	F	Full	4	....	Arv	I	Torb	.....	.....	Own	34x4	36x7	Ross	155	Pier	.....	.....	65
Erie 2½	5400	....	Buda	4 1/4 x5 1/2	28.9	L	C	McC	B	Strm	...	Bos	...	D	Full	4	....	Spic	W	Shel	.....	.....	Per	34x4	36x6	Ross	150	Pier	.....	.....	80
Gary J	4850	2750	Buda	4 1/4 x5 1/2	28.9	L	C	T	F	Mas	G	Eis	...	D	B-Li	4	U	Spic	W	Timk	8.5:1	40.8:1	S-El	36x4	36x7	Ross	148	Pier	Pru	Gdy	....
Gersix G	5200	3150	Buda 6	3 1/2 x5 1/4	29.4	L	C	I	S	Strm	V	Bos	W	B	Cott	3	U	Bld	W	Own	9.66:1	39:1	Tut	36x4	36x7	Ross	150	Mon	Jon	.....	75
Gersix K	5200	3150	Buda	4 1/4 x5 1/2	28.9	L	C	I	F	Strm	V	Bos	...	B	Cott	3	U	Bld	W	Own	9.66:1	39:1	Tut	36x4	36x7	Ross	150	Mon	Jon	.....	75
Gramm-Bernstein 25	5300	3650	Cont	4 1/4 x5 1/2	28.9	R	C	T	F	Strm	V	Eis	...	D	Own	4	A	Own	W	Stan	7.75:1	36.7:1	.....	36x4	36x4†	Ross	150	.....	.....	Fir	91.3
Harvey WFA	5300	3300	Buda	4 1/4 x5 1/2	28.9	L	T	.....	B	Strm	G	Eis	...	B	B-Li	4	A	Spic	W	Shel	7.75:1	31:1	Shel	36x4	36x7	Ross	150	Dup	Sch	.....	60
Hendrickson I	....	3000	Buda	4 1/4 x5 1/2	28.9	L	C	T	F	Strm	G	Dix	...	D	Full	4	A	Ther	W	Timk	7.75:1	37.2:1	S-El	36x4	36x7	Ross	Q	Pier	.....	.....	80
Hewitt-Ludlow	4800	3300	Buda	4 1/4 x5 1/2	28.9	...	..	.....	F	Strm	...	.....	...	B	Cott	4	....	Spic	W	Wis	.....	.....	.....	36x4	36x7	Ross	150	.....	.....	.....	....
Jumbo C	4450	2900	Buda	4 1/4 x5 1/2	28.9	L	C	GO	F	Zen	G	Eis	...	F	Full	3	U	Arv	I	Cl	9:1	31.5:1	Det	36x4	36x7	Jac	108	Dup	Mil	.....	60
Jumbo E	4500	2775	Buda	4 1/4 x5 1/2	28.9	L	C	GO	F	Zen	G	Eis	...	F	Full	3	U	Arv	I	Cl	9:1	31.5:1	Det	36x4	36x7	Jac	168	Dup	Mil	.....	60
Kankakee E	3500	2475	Cont 6	3 1/2 x5 1/4	29.4	L	C	H	B	Zen	V	Will	D	D	Mun	3	U	Acme	I	Russ	7.4:1	22.2:1	.....	34x4	34x6	Ross	170	.....	Bim	Gdy	70
Kelly-Springfield K35	5200	3500	Own	3 3/4 x5 1/4	22.5	L	C	Fed	F	Zen	G	Eis	W	C	Covt	3	A	Own	C	Dead	10.64:1	35.11:1	Per	36x4	36x4†	Gem	144	Pier	StM	.....	89
Kelly-Springfield K36	5540	3500	Own	3 3/4 x5 1/4	22.5	L	C	Fed	F	Zen	G	Eis	W	C	Covt	3	A	Spic	W	½-Fl	10.33:1	34.02:1	Per	36x4	36x4†	Gem	144	Pier	StM	.....	89
Keystone 40	3600	1795	Own	4 x4 1/2	25.6	L	T	McC	B	Zen	...	Ber	...	F	Full	3	....	Spic	I	Russ	.....	.....	Row	34x3 1/2	36x5	Dit	144	Pier	.....	.....	75
Kimball C	....	....	Wis	4 1/4 x6	28.9	L	C	Flex	B	Zen	...	Eis	...	L	Selec	4	....	Spic	W	Timk	.....	.....	US	36x4	36x7	Lav	Q	Dup	.....	.....	80
Kleiber B	....	3800	Cont	4 1/2 x5 1/2	32.4	...	..	.....	..	Strm	...	Bos	...	...	B-Li	...	...	...	W	.....	.....	.....	.....	36x4	36x8	Ross	160	.....	.....	.....	....
Koehler M	5050	2985	Her	4 x5 1/8	25.6	R	C	T	P	Zen	G	Eis	...	D	B-Li	4	A	Spic	W	Timk	9.25:1	37:1	.....	36x4	36x7	Lav	162	Simp	Wan	SAE	75
Larrabee-Deyo CD	5200	3000	Cont	4 1/8x5 1/4	27.2	L	C	Bus	S	Strm	...	Bos	...	L	B-Li	4	....	M	W	Shel	.....	.....	Mer	36x4	36x7	Ross	154	Pier	.....	.....	....
L.M.C	4500	2950	Cont	4 1/8x5 1/4	27.2	L	C	T	S	Strm	P	Bos	R	B	Det	4	A	Ther	I	Russ	8.8:1	.....	Math	36x4	36x4	Lav	164	Pier	.....	.....	80
Maccar H	5110	3500	Cont	4 1/2 x5 1/2	32.4	L	C	Own	B	Strm	G	Bos	...	L	B-Li	3	U	Spic	W	Timk	7.75:1	31.08:1	Mer	36x4	36x4†	Ross	162	Pier	Sch	Fir	70
Moreland 19C	5380	3775	Cont	4 1/2 x5 1/2	32.4	L	C	C	F	Mill	G	Dix	...	D	Selec	4	A	Ther	W	Timk	6.8:1	32.9:1	US	36x4	36x7	Ross	Q	.....	Smi	SAE	....
Netco H	6500	3400	Cont	4 1/2 x5 1/2	32.4	L	C	R-T	S	Zen	G	Eis	...	L	B-Li	4	A	Hart	W	Timk	7.75:1	39:1	Per	36x4	36x8	Ross	170	.....	Arc	SAE	75
Noble NW2	5050	3100	Cont	4 1/4 x5 1/4	27.2	L	C	T	B	Strm	...	Eis	...	B	Full	4	....	Bld	W	Shel	.....	.....	Kal	36x4	36x7	Ross	148	Pier	.....	.....	80
Old Reliable B	5750	3250	Wis	4 1/4 x6	28.9	L	C	H	B	Strm	...	Bos	...	B	Full	3	....	Spic	W	Shel	.....	.....	Shel	34x4	36x4†	Ross	160	Mon	.....	.....	....
Paige 50-18	5200	2950	Cont	4 1/8x5 1/4	27.2	L	C	T	B	Strm	G	Bos	...	B	Selec	4	A	Spic	W	Timk	8.5:1	40.88:1	Per	36x4	36x7	Simp	150	Pier	Sch	.....	80
Patroit Washington	4600	3150	Cont	4 1/8x5 1/4	27.2	L	C	Own	B	Strm	V	Bos	...	B	Selec	4	A	Ther	W	Timk	9.66:1	38.64:1	S-El	34x4	34x7	W	156	Pier	.....	Gdy	80
Pittsburger B	5500	3200	Cont	4 1/8x5 1/4	27.2	L	C	T	F	Strm	V	Bos	...	L	B-Li	4	U	Spic	W	Shel	8.75:1	35.8:1	S-El	36x5	36x7	Ross	160	Mon	Smi	.....	67.5
Reliance 20	5500	3200	Buda	4 1/4 x5 1/2	28.9	L	C	H	F	Strm	G	Eis	...	F	Full	4	A	Acme	C	Dead	9.6:1	46:1	Shel	36x4	36x4†	Ross	156	Pier	Wan	Gdy	90
Republic 19	4150	2395	Cont	4 1/8x5 1/4	27.2	L	C	H	B	Strm	G	Eis	...	D	Full	4	U	Arv	I	Torb	8:1	23.09:1	S-El	36x6*	40x8*	Jac	144	Phar	Pru	Fir	....
Rock Falls	2800	....	Buda 6	3 1/2 x5 1/4	29.4	L	P	H	B	Rayf	...	Bos	W	B	GLee	3	....	Spic	G	Flot	.....	.....	Tut	35x5	35x5*	Gem	150	.....	.....	.....	60
Rowe CDW	4600	3250	Wis	4 x5	25.6	L	C	May	F	Zen	...	Bos	...	L	B-Li	4	....	Arv	W	Timk	.....	.....	Shel	34x4	36x4†	Ross	164	Simp	.....	.....	61
Royal	....	3500	Wis	4 1/2 x6	29.8	..	C	T	..	Strm	...	Bos	Q	B	Own	4	....	Own	W	Timk	.....	.....	Mer	36x4 1/2	36x6	Ross	132	Mon	.....	.....	....
Sandow J	4500	2975	Cont	4 1/8x5 1/4	27.2	L	P	T	B	Strm	G	Bos	...	B	B-Li	4	U	K-B	W	Timk	9.25:1	31:1	GC	36x4	36x7	Ross	165	Mon	Pru	.....	70
Sanford 25	5200	3000	Cont	4 1/8x5 1/2	27.2	L	P	T	F	Strm	G	Bos	...	B	B-Li	4	A	Spic	W	Shel	8.75:1	13.15:1	S-El	36x4	36x4†	Ross	156	Pier	Hoo	Fir	75
Schacht	6000	3650	Buda	4 1/4 x5 1/2	28.9	R	P	Own	F	Sheb	G	Bos	...	H	Selec	3	A	Flex	W	Own	9.66:1	30.19:1	Nat	36x4	36x4†	Own	156	Dup	StM	.....	70
Schwartz	4000	2675	Cont	4 1/8x5 1/4	27.2	L	P	Own	F	Sheb	...	Bos	...	H	B-Li	3	....	Hart	I	Torb	.....	.....	.....	36x4	36x7	Ross	146	Pier	.....	.....	....
Service 51	5180	3000	Buda	4 1/4 x5 1/2	28.9	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	7.75:1	37.5:1	.....	36x4	36x7	Ross	160	Simp	Bim	.....	75
Sterling	5550	3300	Ster	4 3/4 x5 3/4	28.9	R	C	Own	S	Zen	...	Eis	...	...	B-Li	3	....	Spic	W	Shel	.....	.....	Math	36x4	36x4†	Ross	156	Wau	.....	.....	80
Stoughton E	....	....	....	4 1/2 x5 1/2	32.4	...	C	Own	C	Strm	G	Eis	...	D	B-Li	3	U	.....	W	Shel	7.8:1	.....	S-El	36x4	36x4.	.....	155	.....	Own	Gdy	....
Tiffin MW	4890	3050	Cont	4 1/8x5 1/4	27.2	L	C	T	B	Sheb	G	Bos	...	F	Full	3	U	Acme	W	Shel	8.7:1	41.7:1	Kal	36x4	36x4 1/2†	Ross	148	Pier	Smi	Gdy	80
Tower H2½	4700	3200	Cont	4 1/8x5 1/4	27.2	L	C	T	S	Strm	G	Bos	...	F	Full	3	U	Spic	W	Timk	9.25:1	33:1	Det	36x4	36x7	Ross	146	Pier	.....	Fir	70
Triangle B	4900	2850	Rut	4 7/8x5 1/2	27.2	L	C	Per	F	Strm	G	Eis	...	F	Full	4	U	UP	I	Cl	8:1	39:1	Det	36x4	36x7	Gem	151	Pier	Roy	Fir	60
Union F	4800	2675	Wis	4 x6	25.6	L	P	GO	F	Sheb	G	Eis	...	F	Full	4	U	UP	I	Russ	7.8:1	37.4:1	Math	36x4	36x7	Ross	152	Dup	Pru	.....	70
United B	....	2975	Buda	4 1/4 x5 1/2	28.9	L	C	T	F	Strm	...	Eis	Q	L	B-Li	4	....	Bld	I	Cl	.....	.....	.....	36x4	36x7	Ross	Q	Simp	.....	.....	80
U.S.H	5200	3250	Cont	4 1/4 x5 1/2	28.9	L	C	T	S	Strm	G	Eis	...	H	B-Li	4	A	Q	W	Shel	7.75:1	31:1	Shel	34x4	36x4†	Lav	144	Pier	Sch	.....	80
Ward LaFrance 2A	5260	3350	.....	4 1/8x5 1/4	27.2	L	G	O	S	Zen	G	Mag	...	B	B-Li	4	A	Spic	W	Timk	7.75:1	37.4:1	.....	36x4	36x7	Ross	154	Simp	.....	.....	85
Wichita R	5200	2950	Wau	3 3/4 x5 1/4	22.5	L	P	Per	C	Strm	G	Bos	...	C	Covt	3	A	Own	W	Shel	10.66:1	3.65:1	.....	36x4	36x7	Ross	144	Wau	Smi	Fir	....
Wilcox Q	4700	....	Own	4 1/4 x5 1/2	28.9	L	P	T	S	Strm	G	Mag	...	W	Selec	4	A	Own	W	½-Fl	8.6:1	42.35:1	Shel	36x4	36x3 1/2†	Ross	135	Pier	Smi	.....	80
3 Ton																															
F.W.D.-B	6300	4500	Wis	4 3/4 x5 1/2	36.1	T	C	T	F	Strm	G	Eis	...	D	Cott	3	A	Q	B	Flot	8.9:1	35.6:1	Tut	36x6	36x6	Ross	124	Pier	Sch	Q	55
Forschler B-X	4725	3450	Cont	4 1/8x5 1/4	27.2	L	C	Own	B	Zen	...	Bos	Q	F	Full	4	....	Hart	W	Shel	.....	.....	Own	34x4	34x8	Ross	137	Dup	.....	.....	....
Kimball K	....	....	Wis	4 3/4 x5 1/2	36.1	T	C	Flex	F	Zen	...	Ber	...	L	B-Li	4	....	Spic	W	Shel	.....	.....	US	36x4	36x8	Ross	Q	Dup	.....	.....	80
O.K. 3T	4250	3350	Buda	4 1/4 x5 1/2	28.9	L	C	T	B	Zen	V	Eis	...	D	Selec	4	U	Hart	W	Wis	8.75:1	56.87:1	Tut	36x4	36x8	Ross	154	Pier	.....	SAE	85
Packard 3E	7000	4350	Own	4 1/2 x5 1/2	32.4	L	C	T	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	9:1	41.3:1	.....	36x5	36x5	Own	156	Own	.....	.....	52.1
Rennoc M	5050	2895	Buda	4 1/8x5 1/2	27.2	L	C	T	F	Strm	...	Spl	...	W	Warn	4	....	Hart	W	Wis	.....	.....	Row	36x5	36x7	Lav	144	Pier	.....	.....	65
Riker B	6900	4600	Own	4 1/4 x6	28.9	T	C	T	B	B&B	G	Ber	W	C	Selec	4	A	Own	W	Own	10:1	42.5:1	Opt	36x5	36x5†	Ross	150	Own	Jon	.....	75
Rowe GW	5500	4500	HSp 8	3 3/4 x5	45	L	C	May	F	Zen	...	AtK	W	L	B-Li	4	....	M	W	Shel	.....	.....	Shel	37x7*	42x9*	Ross	170	.....	.....	.....	55

2½ Ton—Continued

3 Ton

Vim 23	6000	3950	Her	4¼x5½	28.9	L	C	McC	C	Zen	G	Dix	...	D	Selec	4	A	Spic	W	Shel	7.75:1	11.75:1	Shel	36x4	36x4†	Gem	175	Dup	Smi	.....	....
Walter T	6000	....	Wau	4 x5¾	35	L	R	T	F	Strm	...	Bos	W	D	Warn	4	....	M	I	Own	.....	.....	S-El	36x5	36x5†	Ross	162	Own	.....	.....	80
White 40	7050	4300	Own	3¾x5¾	22.5	L	C	T	F	Own	V	Mag	...	D	Selec	4	U	Own	D	Own	.....	.....	.....	36x5	40x5†	Own	174	Own	.....	.....	....
Winther 69	6400	3900	Wis	4 x6	25.6	L	P	T	G	Mas	...	Eis	B	B	B-Li	4	....	Bld	I	Cl	.....	.....	Math	36x5	36x5†	Ross	150	.....	.....	.....	85
3½ Ton																																			
Acason L	6400	....	Wau	4½x6¾	28.9	L	P	Can	S	Sheb	V	Eis	...	B	Cott	4	U	Bld	W	Timk	10.33:1	49:1	Det	36x5	36x5†	Ross	172	Wau	Bim	.....	76
Acme C	6516	3875	Cont	4½x5½	32.4	L	C	GO	B	Rayf	V	Eis	...	B	Cott	3	A	Bld	W	Timk	10.33:1	31.3:1	Det	36x5	40x5†	Ross	168	Dup	Hay	Stn	80
Armleder KW	6600	....	Cont	4½x5½	32.4	L	C	T	F	Zen	G	Bos	...	D	B-Li	3	U	Opt	W	Timk	8.75:1	35:1	Math	36x5	36x5†	Ross	156	Mon	StM	.....	60
Atterbury 7D-LWB	7000	4075	Cont	4½x5½	32.4	L	C	T	S	Zen	G	Eis	...	L	B-Li	4	U	Spic	W	Timk	12:1	48:1	SP	36x5	40x5†	Gem	192	Mon	Arc	Fir	92
Atterbury 7D Standard	6910	3875	Cont	4¼x5½	28.9	L	C	T	S	Zen	G	Eis	...	L	B-Li	4	U	Spic	W	Timk	12:1	48:1	SP	36x5	40x5†	Gem	167	Mon	Arc	Fir	98
Available H3	6400	....	Cont	4½x5½	32.4	L	C	T	B	Strm	G	Bos	...	L	B-Li	4	A	Spic	W	Wis	10.33:1	41:1	Tut	36x5	40x5†	Ross	176	Pier	Sch	.....	....
Bethlehem F	4983	3465	Own	4 x6	30.6	L	P	Fed	B	Sheb	G	Will	G	B	Det	3	U	Spic	I	Russ	9.4:1	30.08:1	Shel	34x4	34x5†	Lav	162	Pier	Wan	Fir	85
Brockway R	6800	3900	Cont	4½x5½	32.4	L	C	Bus	B	Sheb	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	10.33:1	41.4:1	Mer	36x5	36x5†	Gem	Q	Q	.....	.....	70
Chicago C3½	6900	4300	Her	4¼x5½	30	L	..	T	F	Zen	...	Bos	G	L	B-Li	4	A	Peters	W	Timk	10.33:1	50:1	Math	36x5	36x10	Gem	168	Pier	Q	Stn	...
Clydesdale 90	6600	4075	Cont	4½x5½	32.4	L	C	T	S	Zen	G	Bos	...	L	B-Li	4	A	Spic	W	Timk	10.33:1	50:1	Stan	36x5	40x5†	Ross	170	Own	Smi	.....	78
Corbitt A	6780	4200	Cont	4½x5½	32.4	L	C	T	B	Strm	V	Eis	...	D	B-Li	4	U	Hart	W	Shel	11.75:1	47:1	Shel	36x5	36x10	Ross	178	Pier	Smi	.....	75
Couple Gear	9000	6000	Wis	5.1x5½	41.9	T	G	H	F	Strm	...	Eis	...	...	Own	5	....	Own	B	Own	.....	.....	Tut	36x4†	36x4†	Ross	144	.....	.....	.....	55
Dart L	6740	4000	Buda	4½x6	32.4	L	C	C	F	Zen	G	Eis	...	W	Warn	4	A	Spic	W	Timk	10.75:1	53.6:1	Per	36x5	36x10	Ross	160	Simp	Pru	.....	75
Day-Elder F	5600	3350	Cont	4½x5½	32.4	R	P	Bus	B	Zen	G	Ber	...	D	B-Li	4	U	Hart	W	Wis	15:1	40:1	Shel	36x5	36x5†	Ross	165	Mon	Jon	Stn	73
Denby 27	6890	4250	Cont	4½x5½	32.4	L	C	Lng	B	Strm	G	Eis	...	D	Warn	4	A	UP	I	Cl	10:1	49.9:1	Det	36x5	36x10	Ross	170	Simp	Smi	.....	78
Diamond T-LB	6425	4390	.....	4½x5½	32.4	L	C	T	B	Strm	G	Bos	...	L	.....	4	A	Spic	W	.....	8.75:1	42.35:1	Math	36x5	36x5†	.....	180	Pier	.....	.....	....
Dorris K7	6500	4200	Own	4¼x5½	28.9	O	P	T	F	Strm	G	Bos	D	...	Warn	4	A	Spic	W	Timk	1:1	4.99:1	Row	36x5	36x10	Ross	176	Own	Smi	Fir	70
Duplex E	6050	4000	Buda	4½x5½	28.9	O	C	L	B	Sheb	V	Eis	...	L	B-Li	4	U	Peters	I	Own	8:1	32:1	Tut	36x6	36x6	Wohl	130	.....	Pru	.....	60
Erie 3½	7200	....	Buda	4¼x5½	28.9	L	C	McC	B	Strm	...	Bos	...	D	Full	4	....	Spic	W	Shel	.....	.....	Per	36x5	40x5†	Ross	168	Pier	.....	.....	80
Fageol 4500	7300	....	Wau.	4¾x6¾	36.1	L	C	Spi	S	Zen	...	Dix	...	B	Selec	5	....	Spic	W	Timk	.....	.....	Math	36x5	36x5†	Ross	156	Wau	.....	.....	....
Federal WD	7000	3650	Cont	4½x5½	32.4	L	C	T	B	Zen	G	Eis	...	B	Own	4	A	Spic	W	Timk	10.33:1	51.54:1	Math	36x5	36x5†	Gem	156	Phar	Smi	.....	74.5
Garford 77C	7235	4300	Wis	4¾ x5½	36.1	T	C	T	F	Rayf	G	Eis	...	L	Selec	4	A	Spic	W	Timk	1:1	4.84:1	Per	36x5	40x5†	Ross	128	Simp	Smi	Gdy	....
Gary KT	7000	3850	Buda	4½x6	32.4	L	C	T	F	Mas	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	10.33:1	41.33:1	S-El	36x5	40x5†	Ross	162	Pier	Pru	.....	....
Giant 17	6800	3850	Cont	4½x5½	32.4	L	C	C	B	Strm	...	Eis	...	L	Warn	4	....	Spic	W	Timk	.....	.....	Det	36x5	36x5†	Ross	116	Pier	.....	.....	70
G. .M.C. 71A	7540	3750	Cont	4½x5½	32.4	L	C	McC	B	Mar	G	Eis	...	E	Selec	4	A	Own	W	Timk	12:1	58.6:1	Det	36x5	40x5†	Jac	163	Mon	Own	SAE	75
G.M.C. 71B	7655	3800	Cont	4½x5½	32.4	L	C	McC	B	Mar	G	Eis	...	D	Selec	4	A	Own	W	Timk	12:1	58.6:1	Det	36x5	40x5†	Jac	187	Mon	Own	SAE	75
Gramm-Bernstein 35	6900	4450	Cont	4½x5½	32.4	R	C	T	F	Strm	V	Eis	...	D	Own	4	A	Own	W	Stan	8.75:1	50.6:1	.....	36x5	40x5†	Ross	156	.....	.....	Fir	91.7
Hahn F	7000	....	Cont	4½x5½	32.4	L	C	Own	F	Strm	...	Bos	...	D	B-Li	4	....	Spic	W	Timk	.....	.....	Det	36x5	36x5†	Ross	Q	Pier	.....	.....	....
Hall	6100	3750	Cont	4½x5½	32.4	L	P	L	B	Zen	G	Bos	...	L	B-Li	..	A	K-B	W	Timk	10.33:1	.....	Det	36x5	36x5†	Gem	Q	Dup	Sim	.....	....
Harvey WHA	7700	4300	Buda	4½x6	32.4	L	P	.....	B	Strm	G	Eis	...	B	B-Li	4	A	Spic	W	Shel	8.75:1	42.35:1	Shel	36x5	36x5†	Ross	160	Dup	Smi	.....	60
Hendrickson J	....	3800	Buda	4¼x5¾	28.9	L	P	T	F	Strm	G	Dix	...	D	Full	4	A	Ther	W	Timk	10.33:1	49.6:1	Tut	36x5	36x5†	Ross	Q	Pier	.....	.....	80
Hewitt-Ludlow	6300	4000	Buda	4½x5½	28.9	...	...	...	...	Strm	...	Bos	...	B	Cott	4	....	Spic	W	Wis	.....	.....	.....	36x5	36x5†	Ross	156	.....	.....	.....	....
Hulburt	6400	4400	Buda	4½x6	32.4	L	C	T	B	Flch	G	Eis	...	D	B-Li	4	A	Spic	W	Flot	8.66:1	41.91:1	.....	36x5	36x5	Ross	152	Dup	Wan	.....	....
Indiana 35	6900	3600	Rut	4⅜x5½	30.6	L	C	T	F	Strm	G	Eis	...	B	Selec	4	A	Spic	W	½-Fl	10.25:1	56.87:1	S-El	36x5	36x5†	Wohl	156	Pier	Smi	.....	75
Kalamazoo K	7370	3900	Cont 6	3¾x5¼	33.8	L	P	Hvn	B	Strm	...	Bos	D	B	Full	4	....	Acme	W	Shel	.....	.....	Shel	36x5	36x5†	Ross	160	Pier	.....	.....	....
Kelly-Springfield K40	8285	4400	Own	4½x6½	32.4	T	C	Fed	F	Rayf	G	Eis	W	C	Covt	3	A	Own	C	Dead	10.48:1	31.6:1	Pier	36x5	40x5†	Gem	150	Pier	StM	.....	93
Kissel Heavy Duty	6840	3975	Own	4¼x5½	28.9	L	C	McC	S	Strm	V	Eis	...	W	Warn	4	A	Spic	W	Shel	11.75:1	.....	Shel	36x5	36x5†	Ross	168	Pier	Smi	.....	80
Kleiber C	....	4400	Cont	4½x5½	32.4	...	...	...	...	Strm	...	Bos	...	...	B-Li	..	....	.....	W	.....	.....	.....	.....	36x5	36x10	Ross	163	.....	.....	.....	....
Larrabee-Deyo AB	6850	3950	Cont	4½x5½	32.4	L	C	Bus	S	Strm	G	Bos	...	L	B-Li	4	A	M	W	Shel	10.25:1	41:1	Mer	36x5	36x5†	Ross	172	Pier	Hoo	.....	....
Maccar M	6550	4300	Cont	4½x5½	32.4	L	C	Own	B	Strm	G	Bos	...	L	B-Li	3	U	Spic	W	Timk	8.75:1	35.08:1	Mer	36x5	36x5†	Ross	172	Pier	Day	Fir	70
Mack AC	8070	4950	Own	5 x6	40	L	C	Own	S	Zen	...	Lix	Q	O	Selec	3	....	Spic	C	Dead	.....	.....	Mer	36x5	40x5†	Own	Q	Own	.....	.....	70
Master A	6900	3990	Buda	4½x6	32.4	L	C	T	B	Mas	G	Eis	...	B	B-Li	4	A	Spic	W	Timk	10.33:1	41.32:1	Det	36x5†	40x5	Ross	158	Pier	Pru	.....	72
Master AL	7200	4090	Buda	4½x6	32.4	L	C	T	B	Mas	G	Eis	...	B	B-Li	4	A	Spic	W	Timk	10.33:1	41.32:1	Det	36x5†	40x5	Ross	194	Pier	Smi	.....	72
Menominee G	....	3880	Cont	4½x6½	32.4	T	C	T	B	Strm	G	Eis	...	F	Full	4	A	Spic	W	Timk	10.33:1	41.32:1	Tut	36x5	36x6†	Gem	160	Pier	Stn	Fir	80
Nelson & LeMoon F3½	6000	3750	Cont	4¼x6½	28.9	T	C	T	S	Strm	G	Bos	...	L	B-Li	4	U	Own	W	Timk	8.75:1	2:1	Tut	36x5	36x5†	Lav	Q	Mon	Pru	Gdy	80
Northway B3	.....	.....	.....	4 x6	25.6	...	...	.....	...	.....	V	Mag	...	D	.....	..	U	.....	O	.....	10.25:1	49.2:1	S-El	36x5	40x5†	Ross	160	.....	.....	.....	....
Old Reliable C	6650	4000	Wis	4¼x6	28.9	L	C	T	B	Strm	...	Bos	...	D	Full	3	....	Spic	W	Shel	.....	.....	Shel	34x5	36x5†	Ross	160	Mon	.....	.....	....
Oneida D	7270	3700	Cont	4½x5½	32.4	L	C	T	B	Rayf	G	Bcs	...	D	Cott	4	A	Spic	W	Timk	10.5:1	41.33:1	Math	36x5	36x5†	Ross	160	Pier	.....	.....	82.5
Paige 51-18	7000	3950	Cont	4½x5½	32.4	L	C	L	B	Strm	G	Bos	...	D	Selec	4	A	Spic	W	Timk	10.33:1	49.7:1	Per	36x5	36x5†	Jac	160	Simp	Day	.....	80
Parker J9	6800	4150	Wis	4½x6	32.4	L	C	Own	F	Strm	G	Bos	W	L	Warn	4	A	K-B	W	Own	7.8:1	38.92:1	S-El	38x7*	44x10	Ross	160	Mon	Bim	.....	80
Pioneer A	.....	3290	Cont	4½x5½	32.4	...	C	.....	...	Strm	...	Eis	...	...	B-Li	4	.....	.....	W	Timk	.....	.....	.....	36x5	36x5†	.....	160	.....	.....	.....	....
Republic 20	6400	3595	Cont	4½x5½	32.4	L	C	T	B	Strm	G	Eis	...	D	Full	4	U	K-B	I	Torb	10:1	26.01:1	S-El	36x5	36x10	Jac	165	Phar	Smi	.....	....
Rowe DEW	6520	3800	Wis	4¼x6	28.9	L	C	May	F	Zen	...	Bos	...	L	B-Li	4	....	M	W	Shel	.....	.....	Shel	36x5	36x5†	Ross	156	Simp	.....	.....	54
Sanford M	6500	3995	Cont	4½x5½	32.4	L	P	T	B	Strm	G	Bos	...	D	B-Li	4	A	K-B	W	Timk	10.33:1	42:1	GC	36x5	36x5†	Ross	175	Mon	Pru	.....	70
Sanford 35	6600	3975	Cont	4½x5½	42.3	L	P	T	F	Strm	G	Bos	...	B	B-Li	4	A	Spic	W	Shel	8.75:1	13.15:1	S-El	36x5	36x5†	Ross	174	Pier	Hoo	Fir	75
Schacht	6500	4150	Buda	4¼x5½	28.9	R	P	Own	F	Sheb	G	Bos	...	H	Own	3	A	Flex	W	Own	10.33:1	32.31:1	Nat	36x5	36x5†	Own	168	Dup	StM	.....	70
Selden 3½A	7100	3850	Cont	4½x5½	32.4	L	P	Bus	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	8.25:1	42:1	Per	36x5	36x10	Gem	162	Pier	Arc	.....	70
Service 71	6700	3900	Buda	4¼x5½	28.9	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	8.75:1	42.3:1	.....	36x5	36x5†	Ross	171	Simp	.....	.....	70
Service 76	7100	4200	Buda	4½x6	32.4	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	7.8:1	37.7:1	.....	36x5	36x5†	Ross	168	Simp	.....	.....	70
Signal M	7070	4100	Cont	4½x5½	32.4	L	C	McC	B	Strm	G	Eis	...	B	B-Li	4	A	Spic	W	Timk	12:1	4.84:1	Det	36x5	40x5†	Lav	168	Pier	Hay	Gdy	80
Standard 66	6480	3675	Cont	4½x5½	32.4	L	C	T	B	Strm	V	Eis	...	D	B-Li	4	A	Spic	W	Timk	10.33:1	41.4:1	.....	36x5	36x5†	Gem	160	Mon	.....	.....	75
Sterling	8300	4325	Ster	4¼x6¾	28.9	L	C	Own	S	Rayf	...	Eis	...	N	Own	4	....	Spic	W	Timk	.....	.....	Math	36x5	40x5†	Ross	162	Wau	.....	.....	90
Stewart 10	6080	3500	Cont	4½x5½	32.4	L	P	.....	B	Zen	...	Eis	...	F	Full	4	....	Hart	I	.....	.....	.....	Det	36x5	36x5†	Ross	165	Pier	.....	.....	80
Tiffiin PW	6850	3980	Cont	4½x5½	32.4	L	C	T	S	Sheb	G	Bos	...	F	Full	4	A	Acme	W	Shel	8.7:1	41.7:1	Kal	36x5	36x5†	Ross	160	Pier	Smi	Gdy	80
Titan	7350	4300	Buda	4½x6	32.4	L	P	T	F	Strm	G	Eis	...	D	Cott	4	A	.....	I	Timk	9:1	48:1	Math	36x5	40x5†	Lav	162	Simp	.....	.....	70
Tower G3½	6800	4100	Cont	4½x5½	32.4	L	C	T	S	Strm	G	Bos	...	F	Full	4	U	Spic	W	Timk	10.33:1	50:1	Det	36x5	36x5†	Ross	165	Pier	.....	.....	70
Twin City 4 Wheel D-B	7200	4750	Wis	5½x6	42	T	C	H	B	Strm	G	K-W	...	M	Cott	3	A	.....	I	½-Fl	.....	.....	.....	36x6	36x6	Ross	140	Pier	Arc	SAE	60
United C	....	3675	Buda	4½x5½	28.9	L	C	.....	F	Strm	G	Eis	Q	L	B-Li	4	A	Bld	I	Cl	10:1	.....	.....	36x5	36x5†	Ross	160	Simp	Cla	Fir	80
U. S. J	7000	3950	Cont	4½x5½	32.4	L	C	T	S	Strm	G	Eis	...	H	B-Li	4	A	Opt	W	Shel	10.75:1	49.6:1	Shel	36x5	40x5†	Lav	162	Pier	Sch	.....	80
Velie 26B	7400	3900	Cont	4½x5½	32.4	L	C	T	B	Strm	V	Bos	...	L	B-Li	4	A	Spic	W	Timk	10.33:1	49.88:1	Math	36x5	36x5†	Gem	174	Pier	Bim	Gdy	80
Victor M	6600	3800	Cont	4½x5½	32.4	L	C	Own	B	Strm	...	Bos	...	L	B-Li	4	....	Spic	W	Timk	.....	.....	S-El	36x6	36x5†	Gem	176	.....	.....	.....	....
Ward LaFrance 3½A	5800	3900	.....	4½x5½	32.4	L	C	Own	S	Zen	G	Mag	...	B	B-Li	4	A	Spic	W	Wis	9:1	43.56:1	.....	36x5	40x5†	Ross	170	Simp	.....	.....	85
Wichita O	6500	3750	Wau	4½x5¾	32.4	...	C	EM	C	Strm	...	Bos	...	C	B-Li	4	....	Own	W	Shel	.....	.....	.....	36x5	36x5†	Ross	165	Wau	.....	.....	....
Wilcox P	6300	....	Own	4¼x5	28.9	L	C	T	S	.....	G	Bos	...	C	Selec	4	A	Own	W	½-Fl	11.75:1	57.1:1	Shel	36x6	35x5†	Own	139	Pier	Smi	.....	....
Wilson G	6800	3950	Cont	4½x5½	32.4	L	C	T	B	Mar	G	Eis	...	D	Warn	4	A	K-B	W	Timk	8.75:1	43.66:1	Tut	36x5	36x5†	Ross	160	Pier	.....	.....	80
Winther 479	7700	4900	Wis	4¼x6	28.9	L	P	T	G	Mas	...	Eis	B	B	Full	4	....	Bld	I	Cl	.....	.....	Math	36x5	36x5†	Ross	158	.....	.....	.....	65
4 Ton																																			
Bessemer K2	6740	3985	Cont	4½x5½	32.4	L	C	C	B	Rayf	...	Bos	...	B	B-Li	4	....	Spic	I	Torb	.....	.....	Per	36x5	36x10†	Ross	175	Pier	.....	.....	75
Gabriel F	5800	4300	Buda	4½x6	32.4	L	T	T	F	Rayf	...	Bos	L	B	B-Li	4	....	Spic	W	Timk	.....	.....	Mer	36x5	40x10	Gem	180	Dup	.....	.....	65
Highway-Knight	7400	4800	.....	4 x 6	25.6	...	T	Own	F	Zen	V	Mag	...	...	.....	4	A	.....	W	.....	8.75:1	42.35:1	.....	36x5	36x5†	.....	159	.....	Sch	.....	....

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Location	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
4 Ton—Continued																															
Kelly-Springfield K45	8730	4550	Own	4½x6½	32.4	T	C	Fed	F	Rayf	G	Eis	W	C	Covt	3	A	Own	C	Dead	10.71:1	32.3:1	Per	36x5	40x6†	Gem	150	Pier	StM	.....	93
Kimball E	....	....	Wis	5.1x5½	41.9	T	C	Flex	F	Zen	...	Ber	...	L	B-Li	4	....	Spic	W	Shel	.....	.....	US	36x5	40x10	Ross	Q	Dup	.....	.....	80
King Zeitler	6500	4200	Cont	4½x5½	32.4	L	G	T	B	Strm	...	Bos	...	L	B-Li	4	....	Ther	W	Timk	.....	.....	Mer	36x5	40x5†	Lav	180	Pier	.....	.....	80
Moreland 19G	7810	4875	Cont	4¾x6	36.1	L	C	C	B	Mill	...	Dix	...	D	Selec	4	....	Ther	W	Timk	.....	.....	US	36x5	40x5†	Ross	162	Cont	.....	.....	....
Noble WW4	7170	3950	Cont	4½x5½	32.4	L	C	T	B	Strm	...	Eis	...	D	Full	4	....	Acme	W	Shel	.....	.....	Kal	36x5	36x5†	Ross	168	Pier	.....	.....	80
Packard 4E	7460	4550	Own	4½x5½	32.4	L	C	T	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	10:1	46:1	.....	36x5	40x5	Own	156	Own	.....	.....	55
Riker BB	7200	4700	Own	4¼x6	28.9	L	C	T	B	B&B	G	Ber	W	C	Selec	4	A	Own	W	Own	10:1	42.5:1	Q	36x5	36x6†	Ross	150	Own	.....	.....	77
Union H	6600	3500	Wis	4¼x6	28.9	L	P	GO	F	Sheb	G	Eis	...	F	Full	4	U	UP	I	Torb	10.25:1	49.2:1	Math	36x6	36x10	Ross	171	Dup	Smi	.....	75
Winther 89	7600	4200	Wis	4¼x6	28.9	L	P	T	G	Mas	...	Eis	B	B	B-Li	4	....	Bld	I	Cl	.....	.....	Math	36x5	40x5†	Ross	156	.....	.....	.....	80
5 Ton																															
Acason M	8350	5150	Wau	4¾x6¾	36.1	L	P	Can	S	Strm	V	Eis	...	B	Cott	3	U	Bld	W	Timk	10.25:1	48.5:1	Det	36x6	40x6†	Ross	187	Wau	Smi	.....	77
Acme E	8860	4975	Cont	4¾x6	36.1	L	C	GL	F	Rayf	V	Eis	...	B	Cott	3	A	Bld	W	Timk	11.66:1	46.6:1	Det	36x6	40x6†	Ross	180	Cont	Smi	Stn	80
Atterbury 8E	9635	4975	Cont	4¾x6	36.1	L	C	G	F	Zen	V	Eis	...	L	B-Li	4	A	Spic	W	Timk	11.6:1	56.14:1	SP	36x5	40x6†	Gem	167	Cont	Day	.....	98
Available 5	8900	....	Cont	4¾x6	36.1	L	C	T	B	Strm	V	Bos	...	L	B-Li	4	A	Spic	W	Timk	11.66:1	56.4:1	Tut	36x6	40x6†	Ross	176	Pier	Sch	.....	....
Brockway T	8800	5000	Cont	4¾x6	36.1	L	C	Bus	F	Sheb	V	Eis	...	L	B-Li	4	A	Spic	W	Timk	11.66:1	46.75:1	Mer	36x5	40x6†	Gem	174	Dup	Smi	.....	70
Clydesdale 120B	8500	4975	Cont	4¾x6	36.1	R	C	T	F	Strm	V	Eis	...	L	B-Li	4	A	Spic	W	Timk	11.66:1	56.5:1	Stan	36x5	40x6†	Ross	176	Own	Smi	.....	76
Corbitt AA	8000	5000	Cont	4¾x6	36.1	L	C	McC	F	Strm	V	Eis	...	D	B-Li	4	A	Bld	W	Shel	10.25:1	49.61:1	Shel	36x6	40x6†	Ross	178	Cont	Smi	.....	75
Couple Gear	11000	6500	Wis	5¼x7	44.1	T	G	H	F	Strm	...	Eis	O	...	Own	5	....	Own	B	Own	.....	.....	Tut	36x5†	36x5†	Own	144	....	.....	.....	60
Day-Elder E	8200	4500	Buda	4½x6	32.4	L	P	Bus	F	Zen	G	Eis	...	D	B-Li	4	A	Hart	W	Shel	13.1:1	42.3:1	Shel	36x5	40x6†	Ross	170	Mon	Jon	Stn	73
Denby 210	8590	4900	Cont	4½x5½	32.4	L	C	L	B	Strm	G	Eis	...	D	Warn	4	A	UP	I	Cl	12.55:1	62.62:1	Det	36x6	40x12	Ross	170	Simp	Cla	.....	80
Diamond T-R	7920	5190	.....	4½x5½	32.4	L	C	T	B	Strm	G	Bos	...	L	.....	4	A	Spic	W	.....	13.66:1	66.14:1	Math	36x6	40x6†	.....	170	Pier	.....	.....	....
Diamond T-S	8790	5660	.....	4¾x6	36.1	L	C	T	B	Strm	G	Bos	...	L	.....	4	A	Spic	W	.....	11.66:1	56.43:1	Math	36x6	40x6†	.....	180	Pier	.....	.....	....
Fageol 5300	8300	....	Wau	4¾x6¾	36.1	L	C	Spi	S	Zen	...	Dix	...	B	Selec	5	....	Spic	W	Timk	.....	.....	Math	36x6	40x6†	Ross	156	Wau	.....	.....	80
Federal X	8200	4500	Cont	4½x5½	32.4	L	C	T	B	Zen	G	Eis	...	B	Own	4	A	Spic	W	Timk	13.66:1	86.16:1	Math	36x6	40x6†	Gem	156	Phar	Smi	.....	77.5
Garford 68	8870	5000	Wis	4¾x5½	36.1	T	C	T	F	Rayf	G	Eis	...	L	Selec	4	A	Spic	C	Dead	1:1	4:1	Per	36x6	40x6†	Ross	128	Simp	Smi	Gdy	....
Gary M	8500	4850	Buda	5 x6½	40	L	C	T	F	Mas	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	11.66:1	56.43:1	S-El	36x6	40x6†	Ross	170	Pier	Day	.....	....
G.M.C. 101A	8485	4350	Cont	4½x5½	32.4	L	C	McC	B	Mar	G	Eis	...	L	B-Li	4	A	Own	W	Timk	13.6:1	66.7:1	Det	36x6	40x6†	Lav	163	Mon	Own	SAE	75
G.M.C. 101B	8655	4400	Cont	4½x5½	32.4	L	C	McC	B	Mar	G	Eis	...	D	Selec	4	A	Own	W	Timk	13.6:1	66.7:1	Det	36x6	40x6†	Lav	187	Mon	Own	SAE	75
Gramm-Bernstein 50	9500	5500	Cont	4¾x6	36.1	R	C	T	F	Strm	V	Eis	...	C	Own	4	A	Own	W	Stan	9.50:1	55:1	.....	36x6	40x6†	Ross	168	.....	.....	Fir	92.2
Hall	7400	4850	Cont	4½x5½	32.4	L	T	L	B	Zen	G	Bos	...	L	B-Li	..	A	K-B	W	Timk	13.66:1	.....	Per	36x4	40x6†	Gem	Q	Dup	Smi	.....	....
Harvey WKA	8900	5000	Buda	4½x6	32.4	L	P	.....	B	Strm	G	Eis	...	B	B-Li	4	A	Spic	W	Shel	8.75:1	42.35:1	Shel	36x6	40x6†	Ross	160	Dup	Smi	.....	60
Hendrickson K	....	5000	.....	5 x6	40	...	C	.....	F	Strm	G	.....	...	D	A	4	....	.....	...	Timk	11.66:1	57:1	S-El	36x6	40x6†	Ross	Q	.....	.....	.....	....
Hewitt-Ludlow	8000	5100	Buda	4½x6	32.4	...	...	.....	...	Strm	...	Bos	...	B	Cott	4	....	Spic	C	.....	.....	.....	.....	.....	36x6	40x6†	Lav	168	.....	.....	.....	....
Highway-Knight	....	5600	.....	4 x6	25.6	...	T	Own	F	Zen	V	Mag	...	...	.....	4	A	.....	W	.....	10.2:1	49.4:1	.....	36x5	40x6†	.....	159	.....	Sch	.....	....
Hurlburt	7800	5250	Buda	4½x6	32.4	L	C	T	B	Flch	G	Eis	...	D	B-Li	4	A	Spic	W	Flot	10.66:1	49.99:1	.....	36x5	40x6†	Ross	156	Dup	Wan	.....	....
Indiana L	8300	4600	Wau	4¾x6¾	36.1	L	L	C	T	Strm	G	Eis	...	B	Selec	4	A	Spic	W	½-Fl	10.25:1	42.53:1	S-El	36x5	40x6	Wohl	167	Wau	Smi	.....	78.5
Kelly-Springfield K50	9175	5150	Own	4½x6½	32.4	T	C	Fed	S	Rayf	G	Eis	W	C	Covt	3	A	Own	C	Dead	12.24:1	44.5:1	Per	36x6	40x12	Gem	150	Pier	StM	.....	93
Kimball F	....	....	Wis	5½x6	42	T	C	Flex	F	Zen	...	Ber	...	L	B-Li	4	....	Spic	W	Shel	.....	.....	US	36x6	40x12	Ross	Q	Dup	.....	.....	80
Kissel Goliath	7500	4785	Own	4¼x5½	28.9	L	C	McC	S	Strm	V	Eis	...	W	Warn	4	A	Spic	W	Shel	11.66:1	.....	Shel	36x6	36x6†	Ross	180	Pier	Smi	.....	75
Kleiber D	....	5300	Cont	5¼x5¾	44.1	...	...	.....	...	Strm	...	Bos	...	B	B-Li	..	....	.....	W	.....	.....	.....	.....	.....	36x6	40x6	Ross	180	.....	.....	.....	....
Larrabee-Deyo T	8500	4750	Cont	4½x5½	32.4	L	C	Bus	S	Strm	G	Bos	...	L	B-Li	4	A	M	W	Shel	11.75:1	57:1	Mer	36x6	40x6†	Ross	176	Pier	Hoo	.....	....
Maccar G	8750	5250	Cont	4¾x6	36.1	L	C	Own	B	Zen	G	Bos	...	L	B-Li	4	A	Spic	W	Timk	10.25:1	49.61:1	Mer	36x5	40x6†	Ross	186	Cont	Day	Fir	70
Master B	8000	4990	Buda	4¾x6¾	36.1	L	C	T	B	Mas	V	Eis	...	D	B-Li	4	A	Spic	W	Timk	10.25:1	49.61:1	Det	36x6†	40x6†	Ross	170	Pier	Smi	.....	72
Master BL	8200	5290	Buda	4¾x6½	36.1	L	C	T	B	Mas	V	Eis	...	D	B-Li	4	A	Spic	W	Timk	10.25:1	49.61:1	Det	36x6†	40x6†	Ross	194	Pier	Smi	.....	72
Menominee J	....	4950	Wis	4¾x5½	36.1	L	C	T	B	Strm	G	Eis	...	F	B-Li	4	A	Spic	W	Timk	13.66:1	.....	Tut	36x6	40x6†	Ross	160	Mon	Stn	Fir	80
Moreland 19J	9000	5350	Cont	4¾x6	36.1	L	C	Own	F	Mill	G	Dix	...	D	Selec	4	A	Ther	W	Timk	10.25:1	49.61:1	US	36x6	40x6†	Ross	192	Cont	Smi	SAE	....
Nelson & LeMoon F5	8000	4750	Buda	4½x6	32.4	L	C	T	F	Strm	G	Bos	W	L	B-Li	4	A	Own	W	Timk	11.66:1	2:1	Tut	36x6	40x6†	Lav	Q	Pier	Pru	Gdy	80
Old Reliable D	8400	5000	Wis	5.1x5½	41.9	T	C	T	B	Strm	...	Bos	...	D	D-Sea	4	....	Spic	W	Shel	.....	.....	Shel	36x5	40x6†	Ross	168	Q	.....	.....	....
Oneida E	9315	4750	Cont	5¼x5¾	44.1	L	C	C	B	Strm	G	Bos	Q	M	Cott	3	A	Spic	W	Timk	11.66:1	46.66:1	Math	36x6	40x12	Ross	180	Pier	.....	.....	82.5
Packard 5-E	8650	5450	Own	5 x5½	40	L	C	T	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	10.66:1	49:1	.....	36x6	40x6	Own	156	Own	.....	.....	57.2
Parker M9	8450	5225	Cont	4¾x6	36.1	L	C	T	Own	F	Strm	V	Bos	W	L	Warn	4	A	K-B	W	Timk	10.25:1	51.15:1	S-El	36x6	40x6†	Ross	160	Cont	Bim	.....	80
Pierce-Arrow R9	8100	5500	Own	4 7/8x6	38.1	T	P	T	F	Own	G	Eis	...	C	Selec	3	A	Own	W	Flot	7.8:1	29.5:1	S-El	36x5	40x6†	Own	168	Own	.....	.....	85
Ploneer J	....	3990	Cont	4½x5½	32.4	...	C	.....	...	Strm	...	Eis	...	...	B-Li	4	....	.....	W	Timk	.....	.....	.....	.....	36x6	40x6†	.....	170	.....	.....	.....	....
Rowe FW	8350	4900	Wis	4¾x5½	36.1	T	C	May	F	Zen	...	Bos	...	L	B-Li	4	....	M	W	Shel	.....	.....	Shel	36x6	40x6	Ross	171	Simp	.....	.....	57
Royal	....	5000	Wis	4¾x5½	36.1	T	C	T	...	Strm	...	Bos	Q	...	Own	..	....	Own	W	Timk	.....	.....	Mer	36x6	42x6†	Ross	168	Mon	.....	.....	....
Sandow L	7800	4775	Cont	4½x5½	32.4	L	P	T	B	Strm	...	Bos	...	D	B-Li	4	....	K-B	W	Timk	.....	.....	GC	36x6	40x6†	Ross	175	Mon	.....	.....	70
Sanford 50	7400	4750	Cont	4½x5½	32.4	L	P	T	F	Strm	G	Bos	...	B	B-Li	4	A	Spic	W	Shel	11.7:1	16.69:1	S-El	36x5	40x6†	Ross	174	Pier	Hoo	Fir	75
Schacht	8000	5150	Buda	4½x6	32.4	R	P	Own	F	Sheb	G	Bos	...	H	Own	8	A	Flex	W	Own	10.33:1	69.3:1	Nat	36x5	40x6†	Own	168	Dup	StM	.....	70
Selden DL	8800	5000	Con*	4½x5½	32.4	L	P	Bus	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	10.25:1	49.2:1	Per	36x6	40x12	Ross	170	Pier	Smi	.....	70
Service 101	8240	5000	Buda	4½x6	32.4	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	10.25:1	49.6:1	.....	36x6	36x6†	Ross	171	Simp	.....	.....	75
Signal R	8200	5100	Cont	4¾x6	36.1	L	C	McC	B	Strm	G	Eis	...	B	B-Li	4	A	Spic	W	Timk	.....	.....	Det	36x6	40x6†	Ross	180	Pier	Smi	Gdy	80
Standard 86	8000	4650	Cont	4¼x5½	32.4	L	C	T	B	Strm	V	Eis	...	D	B-Li	4	A	Spic	W	Timk	11.6:1	56.4:1	.....	36x6	40x6†	Gem	160	Mon	.....	.....	75
Sterling	9600	5100	Ster	4¾x6¾	36.1	L	C	Own	S	Rayf	G	Eis	...	M	Own	3	A	Spic	W	Timk	10.25:1	60.7:1	Math	36x6	40x6†	Ross	168	Wau	Smi	Gdy	90
Tiffin	8400	5000	Cont	3¾x5¼	33.8	L	C	T	B	Sheb	...	Bos	W	D	Covt	3	....	Acme	W	Shel	.....	.....	Kal	36x6	40x6†	Ross	168	.....	.....	.....	80
Titan	9100	5150	Buda	4½x6	32.4	L	P	T	F	Strm	G	Eis	...	D	Cott	4	A	.....	I	Cl	11:1	59:1	Shel	36x5	40x6†	Lav	156	Simp	.....	.....	70
Twin City 4-Wheel Drive	8000	5250	Wis	5⅝x6	46.2	T	C	H	B	Strm	G	K-W	...	M	Cott	3	A	.....	I	½-Fl	.....	.....	.....	.....	36x7	.....	Ross	140	Pier	SAE	.....	60
United V	....	4775	Buda	4½x6	32.4	L	C	.....	F	Strm	G	Eis	Q	L	B-Li	4	A	Bld	I	Cl	.....	.....	.....	.....	36x5	40x6†	Ross	160	Simp	Cla	Fir	80
U.S.K	8500	4850	Wau	4¾x6¾	36.1	L	C	T	F	Strm	G	Eis	...	...	Cott	3	A	Q	W	Shel	8.75:1	34.8†	.....	36x5	40x6†	Lav	168	Wau	Smi	.....	80
Vim 24	8500	....	Her	4¼x5½	28.9	L	C	McC	C	Zen	...	Dix	...	D	Selec	4	....	Spic	W	Shel	.....	.....	Shel	36x5	40x5†	Gem	150	Dup	.....	.....	....
Walter S	8000	....	Wau	4½x6¼	50	L	P	T	F	Strm	...	Bos	W	D	Warn	4	....	M	I	Own	.....	.....	S-El	36x6	40x6†	Ross	168	Own	.....	.....	80
White 45	7925	5000	Own	4¼x5¾	28.9	L	C	T	F	Own	V	Mag	...	D	Selec	4	U	Own	...	Own	.....	.....	.....	36x6	40x5	Own	174	Own	.....	.....	....
Wilcox W	9000	....	Wau	4¾x6¾	36.1	L	C	T	S	.....	...	.....	...	D	Selec	4	A	Spic	W	½-Fl	10.25:1	45.1:1	Shel	36x5	40x12	Gem	162	.....	Smi	.....	....
Wilson H	7500	4800	Cont	4½x5½	32.4	L	C	T	B	Mas	G	Eis	...	D	Warn	4	A	K-B	W	Timk	10.5:1	52.39:1	Tut	36x6	40x6†	Ross	160	Pier	.....	.....	80
Winther 109	8300	5000	Wis	4½x6	32.4	L	C	T	G	Mas	...	Eis	B	B	B-Li	4	....	Bld	I	Cl	.....	.....	Math	36x5	40x6†	Ross	162	Dup	.....	.....	80

5½, 6 and 7 Ton

Doane 1919	8500	5825	Wau	4¾x6¾	36.1	L	C	C	S	Mas	G	Bos	...	D	Selec	3	U	D	C	Dead	10.6:1	.....	.....	36x6	40x6†	Lav	178	Wau	West	.....	79
Hall	8006	4850	Cont	4½x5½	32.4	L	P	L	B	Zen	G	Bos	...	...	B-Li	..	U	K-B	W	Timk	12:1	.....	Det	36x5	40x6†	Gem	Q	Dup	Smi	.....	....
Mack AC5½	8650	5500	Own	5 x6	40	L	C	T	S	Zen	...	Dix	Q	O	Selec	3	....	Spic	C	Own	.....	.....	Mer	36x6	40x6†	Own	105	Own	.....	.....	50
Garford 69	9350	5300	Wis	5.1x5½	41.9	T	C	T	F	Rayf	...	Eis	...	L	Selec	4	....	Spic	C	Dead	.....	.....	Per	36x6	40x7†	Ross	128	Simp	.....	.....	....
Kelly-Springfield K60	9500	5500	Own	4½x6½	32.4	T	C	Fed	F	Rayf	G	Eis	W	C	Covt	3	A	Own	C	Dead	12.39:1	45.2:1	Per	36xx6	40x7†	Gem	150	Own	StM	.....	93
Packard 6E	8925	5700	Own	5 x5½	40	L	C	T	F	Own	...	Dix	B	D	Selec	4	....	Spic	W	Flot	.....	.....	SP	36x6	40x7	Own	156	Pier	.....	.....	58.5
Royal 6	....	5400	Wis	5½x6	42	...	C	T	...	Strm	...	Bos	Q	..	Own	..	....	Own	W	Timk	.....	.....	Mer	36x6	40x6†	Ross	168	Mon	.....	.....	....
Tiffin 6	9000	5200	Cont 6	3¾x5¼	33.8	L	C	T	B	Sheb	G	Bos	W	D	Covt	3	A	Acme	W	Shel	10.25:1	60.7:1	Kal	36x6	40x12	Ross	168	.....	Smi	Gdy	80
Winther 129	9000	5250	Wis	4¾x6	36.1	T	C	T	G	Mas	...	Eis	B	B	B-Li	4	....	Bld	I	Cl	.....	.....	Math	36x6	40x6	Ross	162	Dup	.....	.....	80
Winther 149	9600	5500	Wis	5½x6	42	T	C	T	G	Mas	...	Eis	B	B	B-Li	4	....	Bld	I	Cl	.....	.....	Math	36x6	40x7	Ross	162	Dup	.....	.....	80
Couple Gear 6	11000	7200	Wis	5¼x7	44.1	T	C	H	F	Strm	...	Eis	O	...	Own	5	....	Own	B	Own	.....	.....	Tut	36x5†	36x6	Own	144	.....	.....	.....	65
Mack AC7½	9050	6000	Own	5 x6	40	L	C	Own	S	Zen	...	Dix	Q	O	Selec	3	....	Spic	C	Dead	.....	.....	Mer	36x7	40x7†	Own	Q	Own	.....	.....	70
Old Reliable K,L,M	10240	6000	Wau	4¾x6¾	36.1	L	C	T	B	Strm	...	Bos	...	D	D-Sea	4	....	Spic	W	Shel	.....	.....	Shel	36x6	40x7†	Ross	136	Wau	.....	.....	....
Royal 7	....	....	Wis	5¼x7	44.1	...	C	T	...	Strm	...	Bos	Q	..	Own	..	....	.....	W	Timk	.....	.....	Mer	36x7	40x7†	Ross	168	Mon	.....	.....	....
Sterling 7	11000	5600	Ster	4¾x6¾	....	L	C	Own	S	Rayf	...	Eis	...	M	Own	3	....	UM	C	Own	.....	.....	Math	36x6	40x7	Ross	168	Wau	.....	.....	....
Wichita S	9200	5400	Beav	4½x6	32.4	O	P	EM	C	Strm	G	Ber	...	C	Own	4	A	Own	...	Own	13:1	4.78:1	.....	36x6	40x6†	Ross	165	Dup	Smi	.....	90

5½, 6 and 7 Ton

Gasoline Tractor-Trucks

Columbia T	4000	2350	Cont	4 1/16x5¼	27.2	L	C	T	B	Shk	...	Dix	...	C	Covt	3	....	Spic	I	Russ	.....	.....	Per	36x4	36x6	Own	112	Pier	.....	.....	....
Federal Light Duty	4100	2950	Cont	4 1/16x5¼	27.2	L	C	T	B	Zen	G	Eis	...	B	Own	4	A	Spic	W	Timk	9.25:1	40.7:1	Math	36x4	36x7	Gem	110	Phar	.....	.....	....
Federal Heavy Duty	6800	3775	Cont	4½x5½	32.4	L	C	T	B	Zen	G	Eis	...	B	Own	4	....	Spic	W	Timk	12:1	59.88:1	Math	36x5	36x5†	Gem	114	Phar	.....	.....	70
Garford 70BT	4750	3090	Buda	4¼x5½	28.9	L	C	T	S	Rayf	...	Spl	...	L	Selec	4	....	Spic	W	Timk	.....	.....	Per	36x4	36x7	Ross	119	Simp	.....	.....	....
Garford 77KT	6990	4400	Wis	4¾x5½	36.1	T	C	T	S	Rayf	...	Eis	...	L	Selec	4	....	Spic	W	Timk	.....	.....	Per	36x5	40x5†	Ross	105	Simp	.....	.....	....
Garford 68CT	8450	5100	Wis	5.1x5½	41.9	T	C	T	F	Rayf	...	Eis	...	L	Selec	4	....	Spic	C	Dead	.....	.....	Per	36x6	40x6†	Ross	102	Simp	.....	.....	....
Hewitt-Ludlow 6-Ton	4000	3300	Buda	4¼x5½	28.9	...	..	T	F	Strm	...	Bos	...	B	.....	..	....	Spic	C	.....	.....	.....	.....	36x5	36x4†	Lav	...	.....	.....	.....	....
Hood	2900	1300	Own	3¾x3¾	22.5	T	C	T	S	Holl	...	.....	...	D	Plan	2	....	Own	C	Own	.....	.....	Lah	20x3½	20x5	Own	60	.....	.....	.....	65
Jumbo D	4450	2700	Buda	4¼x5½	28.9	L	C	GO	F	Zen	...	Eis	...	F	Full	3	....	Arv	I	Cl	.....	.....	Det	36x4	36x7	Jac	152	Dup	.....	.....	60
Knox 35	8500	5500	Own	5 x5½	40	O	C	Fed	F	Zen	V	Mag	G	D	Selec	3	A	.....	W	Timk	1:.08	1:.0145	.....	36x4	38x6†	Ross	108	.....	Wan	.....	60
Knox 36 3-Ton	10000	6000	Own	5 x5½	40	O	C	Fed	F	Zen	V	Mag	G	D	Selec	3	A	.....	W	Timk	1:.08	1:.0145	.....	36x4	38x6†	Ross	108	.....	Wan	.....	....
Koehler CT	3150	1950	H-Sp	3½x5	19.6	R	T	T	B	Zen	...	Eis	...	D	MM	3	....	Spic	I	Torb	.....	.....	.....	34x3	34x5	Own	106	Simp	.....	.....	....
Koehler MT	5000	3095	Her	4 x5½	25.6	R	C	T	P	Zen	...	Eis	...	D	B-Li	4	....	Spic	W	Timk	.....	.....	.....	36x4	36x7	Lav	106	Simp	.....	.....	....
Kuhn	9000	5000	Wis	4¼x5½	28.9	T	C	H	S	Rayf	...	Bos	...	C	Selec	4	....	.....	B	Own	.....	.....	.....	36x7	36x7	.....	138	.....	.....	.....	....
Lapeer 3-Ton	3050	2000	Wau	3½x5¼	19.6	L	P	.....	B	.....	...	Mag	...	D	Selec	3	....	.....	I	Torb	.....	.....	.....	34x3½	34x5	Ross	88	.....	.....	.....	55
Lapeer 5-Ton	3400	2700	Wau	4 x5¾	25.6	L	P	.....	B	.....	...	Mag	...	D	Selec	3	....	.....	I	Torb	.....	.....	.....	34x3½	34x3†	Ross	88	.....	.....	.....	....
Lombard	8000	....	Spec 6	5½x6¾	72.7	...	C	Spec	F	Sheb	P	.....	...	D	Spec	..	A	.....	W	.....	.....	.....	.....	.....	.....	Spec	...	.....	.....	.....	90
Mack AB 5-Ton	4900	3400	Own	4 x5	25.6	L	C	H	S	Zen	...	Dix	Q	L	B-Li	4	....	Bld	C	Own	.....	.....	Mer	36x4	36x4†	Own	120	Own	.....	.....	75
Mack AC 7-Ton	7670	4950	Own	5 x6	40	L	C	Own	S	Zen	...	Dix	Q	O	Selec	3	....	Spic	C	Dead	.....	.....	Mer	36x5	40x5†	.....	119	Own	.....	.....	70
Mack AC 11-Ton	8250	5500	Own	5 x6	40	L	C	Own	S	Zen	...	Dix	Q	O	Selec	3	....	Spic	C	Dead	.....	.....	Mer	36x6	40x6†	Own	119	Own	.....	.....	70
Mack AC 15-Ton	8650	6000	Own	5 x6	40	L	C	Own	S	Zen	...	Dix	Q	O	Selec	3	....	Spic	C	Dead	.....	.....	Mer	36x7	40x7†	.....	119	Own	.....	.....	70
Rennoc 8-Ton	5050	2850	Buda	4½x5½	27.2	L	C	T	F	Strm	...	Spl	...	D	Warn	4	....	Hart	W	Wis	.....	.....	Row	36x5	36x7	Lav	116	Pier	.....	.....	60
Walter 5-Ton B	8000	5000	Own	4¾x6	30.6	L	P	T	F	Strm	G	Eis	...	O	Own	4	A	Own	I	.....	9:1	45:1	S-El	36x6	40x6	.....	156	Own	Day	.....	60
Watson	6500	4050	Cont	4½x5½	32.4	L	C	Jam	B	Strm	...	Bos	...	L	B-Li	4	....	Spic	W	Timk	.....	.....	Shel	34x4	36x5	Gem	80	Pier	.....	.....	37

Gasoline Tractor-Trucks

Electric Commercial Cars

E. C. M. Name and Model Number	Carrying Capacity	Chassis Weight	Chassis Price	Maximum Speed	Battery	Mileage Per Charge	Motor	Controller	Speeds Forward	Drive	Rear Axle	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Pr. Cent of Weight on Rear Wheels
Ward WS	750	1400	.....	12	Edis	45	West	West	4	B	Timk	Shel	32x2½	32x3	Own	88	60
C-T ½	1000	1800	1750	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3	36x3	W	90	60
Walker M	1000	2300	.....	15	Opt	60	West	West	5	O	Own	Math	34x3	36x3½	Ross	93	66
Atlantic 1C	2000	2770	.....	12	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x4	Ross	103	65
Ward WA	1250	2730	.....	12	Edis	47	G-E	G-E	4	W	Shel	Shel	32x3	34x3½	Own	90	60
C-T 1	2000	2500	2100	13	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3½	36x4	W	100	60
Walker K	2000	2500	.....	14	Opt	60	West	West	5	O	Own	Math	34x3½	36x4	Ross	96	66
Ward WB	2000	3250	.....	10	Edis	43	G-E	G-E	4	W	Shel	Shel	62x3½	36x4	Own	102	60
Atlantic 2C	4000	3590	.....	11	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x1†	Ross	115	65
C-T 2	4000	3500	2500	11	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x4	36x4†	W	115	60
Walker L	4000	3700	.....	13	Opt	60	West	West	5	O	Own	Math	38x4	38x6	Ross	112	66
Ward WD	4000	4500	.....	8.5	Edis	35	G-E	G-E	4	W	Shel	Shel	36x4	38x5†	Own	114	60
Atlantic 3C	7000	5220	.....	10	Opt	.....	G-E	G-E	5	C	Timk	.....	36x5	40x5†	Ross	135	65
C-T 3½	7000	5000	3650	10	Opt	50	G-F	Own	4	I	Dead	Shel	36x3½†	36x4	W	122	55
Ward WF	7000	6600	.....	7	Edis	30	G-E	G-E	4	W	Shel	Shel	36x5	36x5	Own	132	60
Atlantic 5C	10000	6230	.....	9	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x5†	Ross	144	65
Couple Gear	10000	9000	5800	10	Phil	30	Own	Own	5	B	Own	Tut	36x5†	36x5†	Own	96	55
Couple Gear	14000	10000	4800	7	Phil	30	Own	Own	5	B	Timk	Tut	36x5†	36x5†	Own	96	75
C-T 5	10000	6000	4150	8	Opt	50	G-E	Own	4	I	Dead	Shel	36x4	36x5†	W	132	55
Walker P	7000	5300	.....	11	Opt	50	West	West	5	O	Own	Math	36x5	38x5†	Ross	131	66
Walker N	10000	6300	.....	10	Opt	50	West	West	5	O	Own	Math	36x6	38x6†	Ross	141	66
Ward WH	10000	8375	.....	6	Edis	26	G-E	G-E	4	W	Shel	Shel	36x7	40x10	Own	144	60
Couple Gear	14000	12000	5400	7	Phil	30	Own	Own	5	B	Uimk	Tut	36x5	38x7	Own	194	75
Atlantic 6C	13000	6940	.....	8	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x6	Ross	156	65
Couple Gear	14000	10000	6500	10	Phil	30	Own	Own	5	B	Own	Tut	36x5†	36x5	Own	96	55

Electric Commercial Cars

Manufacturers Whose Models Are Included in Specifications on Preceding Pages

Acason—Acason Motor Truck Co., Detroit, Mich.
Ace—American Motor Truck Co., Newark, Ohio.
Acme—Acme Motor Truck Co., Cadillac, Mich.
All-American—All-American Truck Co., Chicago, Ill.
Apex—Hamilton Motors Co., Grand Haven, Mich.
Armleder—O. Armleder Co., Cincinnati, Ohio.
Atlantic—Atlantic Electric Vehicle Co., Newark, N. J.
Atlas—Martin Truck & Body Corp., York, Pa.
Atterbury—Atterbury Motor Car Co., Buffalo, N. Y.
Autocar—Autocar Co., Ardmore, Pa.
Available—Available Truck Co., Chicago, Ill.

Beck-Hawkeye—Beck-Hawkeye Motor Truck Works, Cedar Rapids, Iowa.
Bessemer—Bessemer Motor Truck Co., Grove City, Pa.
Bethlehem—Bethlehem Motor Truck Corp., Allentown, Pa.
Betz—Betz Motor Truck Co., Hammond, Ind.
Brinton—Brinton Motor Truck Co., Philadelphia, Pa.
Briscoe—Briscoe Motor Corp., Jackson, Mich.
Brockway—Brockway Motor Truck Co., Cortland, N. Y.

C. T.—Commercial Truck Co. of America, Philadelphia, Pa.
Chevrolet—Chevrolet Motor Co. of Mich., Flint, Mich.
Chicago—Chicago Motor Truck, Inc., Chicago, Ill.
Clydesdale—Clyde Cars Co., Clyde, Ohio.
Collier—Collier Motor Truck Co., Bellevue, Ohio.
Columbia—Columbia Motor Truck & Trailer Co., Pontiac, Mich.
Comet—Comet Automobile Co., 156 S. Water St., Decatur, Ill.
Commerce—Commerce Motor Car Co., Detroit, Mich.
Concord—Abbot-Downing Truck & Body Co., Concord, N. H.
Conestoga—Conestoga Motor Truck Co., Lancaster, Pa.
Corbitt—Corbitt Motor Truck Co., Henderson, N. C.
Corliss—Corliss Motor Truck Co., Corliss, Wis.
Couple Gear—Couple Gear Freight Wheel Co., Grand Rapids, Mich.

Dart—Dart Truck & Tractor Corp., Waterloo, Ia.
Day-Elder—Day-Elder Motors Corp., Newark, N. J.
Dearborn—Dearborn Truck Co., Chicago, Ill.
Defiance—Turnbull Motor Truck & Wagon Co., Defiance, Ohio.
DeKalb—DeKalb Wagon Co., DeKalb, Ill.
Denby—Denby Motor Truck Co., Detroit, Mich.
Diamond T—Diamond T Motor Car Co., Chicago, Ill.
Diehl—Diehl Motor Truck Works, Philadelphia, Pa.
Dispatch—Dispatch Motor Car Co., Minneapolis, Minn.
Doane—Doane Motor Truck Co., San Francisco, Cal.
Dodge—Dodge Bros., Detroit, Mich.
Dorris—Dorris Motor Car Co., St. Louis, Mo.
Douglas—Douglas Motors Corp., Omaha, Nebr.
Duplex—Duplex Truck Co., Lansing, Mich.

Ellsworth—Mills-Ellsworth Co., Keokuk, Ia.
Erie—Erie Motor Truck Mfg. Co., Erie, Pa.

F. W. D.—Four Wheel Drive Auto Co., Clintonville, Wis.
Fageol—Fageol Motors Co., Oakland, Cal.
Famous—Famous Trucks, Inc., St. Joseph, Mich.
Fargo—Fargo Motor Truck Co., Chicago, Ill.
Federal—Federal Motor Truck Co., Detroit, Mich.
Ford—Ford Motor Co., Highland Park, Mich.
Forschler—Forschler Motor Truck Mfg. Co., New Orleans, La.
Fulton—Fulton Motor Truck Co., New York, N. Y.

G. M. C.—General Motors Truck Co., Pontiac, Mich.
Gabriel—Gabriel Motor Truck Co., Cleveland, Ohio.
Garford—Garford Motor Truck Co., Lima, Ohio.
Gary—Gary Motor Truck Co., Gary, Ind.
Gersix—Gersix Mfg. Co., Seattle, Wash.
Giant—Giant Truck Corp., Chicago Heights, Ill.
Gramm-Bernstein—Gramm-Bernstein Motor Truck Co., Lima, Ohio.
Grant—Grant Motor Car Corp., Truck Division, Cleveland, Ohio.

Hahn—Hahn Motor Truck & Wagon Co., Hamburg, Pa.
Hall—Lewis-Hall Iron Works, Detroit, Mich.
Harvey—Harvey Motor Truck Co., Harvey, Ill.
Hawkeye—Hawkeye Truck Co., Sioux City, Ia.
Hendrickson—Hendrickson Motor Truck Co., Chicago, Ill.
Hewitt-Ludlow—Ralston Iron Works, San Francisco, Cal.
Highway—Knight-Highway Motors Co., Chicago, Ill.
Higrade—Higrade Motors Co., Harbor Springs, Mich.
Hood—Hood Mfg. Co., Seattle, Wash.
Hoover—Hoover Wagon Co., York, Pa.
Huffman—Huffman Bros. Co., Elkhart, Ind.
Hurlburt—Hurlburt Motors, Inc., New York, N. Y.

Independent—Independent Motor Co., Youngstown, Ohio.
Independent—Independent Motor Truck Co., Inc., Davenport, Ia.
Indiana—Indiana Truck Corp., Marion, Ind.
International—International Harvester Co., Chicago, Ill.

Jones—Jones Motor Car Co., Wichita, Kans.
Jumbo—Nelson Motor Truck Co., Saginaw, Mich.

Kalamazoo—Kalamazoo Motor Corp., Kalamazoo, Mich.
Kankakee—Kankakee Automobile Co., Kankakee, Ill.
Keldon—House Cold Tire Setter Co., St. Louis, Mo.
Kelly-Springfield—Kelly-Springfield Motor Truck Co., Springfield, Ohio.
Keystone—Commercial Car Unit Co., Philadelphia, Pa.
Kimball—Kimball Motor Truck Co., Los Angeles, Cal.
King Zeitler—King Zeitler Co., Chicago, Ill.
Kissel—Kissel Motor Car Co., Hartford, Wis.
Kleiber—Kleiber & Co., Inc., San Francisco, Cal.
Knox—Knox Motors Co., Springfield, Mass.
Koehler—H. J. Koehler Motors Corp., Newark, N. J.
Kuhn—Kuhn Tractor Truck Co., Seattle, Wash.

Lange—Lange Motor Truck Co., Pittsburgh, Pa.
Lapeer—Lapeer Tractor-Truck Co., Lapeer, Mich.
Larrabee-Deyo—Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y.
L. M. C.—Louisiana Motor Car Co., Shreveport, La.
Lombard—Lombard Auto Tractor Truck Corp., New York, N. Y.
Luedinghaus—Luedinghaus-Espenschied Wagon Co., St. Louis, Mo.
Luverne—Luverne Automobile Co., Luverne, Mich.

Maccar—Maccar Truck Co., Scranton, Pa.
Mack—International Motor Co., New York, N. Y.
Manly—Manly Motors Co., Waukegan, Ill.
Master—Master Trucks, Inc., Chicago, Ill.
Maxwell—Maxwell Motor Co., Inc., Detroit, Mich.
Menominee—Menominee Motor Truck Co., Menominee, Mich.
Moore—Moore Motor Vehicle Co., Danville, Ill.
Moreland—Moreland Motor Truck Co., Los Angeles, Cal.
Muskegon—Muskegon Engine Co., Muskegon, Mich.
Myers—E. A. Myers Co., Pittsburgh, Pa.

Napoleon—Napoleon Motors Co., Traverse City, Mich.
Nash—Nash Motors Co., Kenosha, Wis.
Nelson-LeMoon—Nelson & Le Moon, Chicago, Ill.
Netco—New England Truck Co., Fitchburg, Mass.
Noble—Noble Motor Truck Co., Kendallville, Ind.
Northway—Northway Motors Co., Natick, Mass.
Northwestern—Starr Carriage Co., Seattle, Wash.
Norwalk—Norwalk Motor Car Co., Martinsburg, W. Va.

O. K.—Oklahoma Auto Mfg. Co., North Muskogee, Okla.
Ogden—Ogden Motor & Supply Co., Chicago, Ill.
Old Hickory—Kentucky Wagon Mfg. Co., Louisville, Ky.
Old Reliable—Old Reliable Motor Truck Co., Chicago, Ill.
Oldsmobile—Olds Motor Works, Lansing, Mich.
Oneida—Oneida Motor Truck Co., Green Bay, Wis.
Oshkosh—Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.
Overland—Willys-Overland Co., Inc., Toledo, Ohio.

Packard—Packard Motor Car Co., Detroit, Mich.
Paige—Paige-Detroit Motor Car Co., Detroit, Mich.
Parker—Parker Motor Truck Co., Milwaukee, Wis.
Patriot—Hebb Motors Co., Lincoln, Nebr.
Piedmont—Piedmont Motor Car Co., Inc., Lynchburg, Va.
Pierce-Arrow—Pierce-Arrow Motor Car Co., Buffalo, N. Y.
Pioneer—Pioneer Motor Truck Co., Detroit, Mich.
Chicago—Chicago Motor Truck Co., Inc., Chicago, Ill.
Pittsburgher—Pittsburgh Truck Mfg. Co., Pittsburgh, Pa.
Pony—Minnesota Machinery & Foundry Co., Minneapolis, Minn.

Rainier—Rainier Motor Corp., Flushing, L. I., N. Y.
Reliance—Reliance Motor Truck Co., Appleton, Wis.
Rennoc—Rennoc-Leslie Motor Co., Philadelphia, Pa.
Reo—Reo Motor Car Co., Lansing, Mich.
Republic—Republic Motor Truck Co., Inc., Alma, Mich.
Riker—Locomobile Co. of America, Bridgeport, Conn.
Rock Falls—Rock Falls Mfg. Co., Sterling, Ill.
Rowe—Rowe Motor Mfg. Co., Lancaster, Pa.
Royal—Royal Motor Truck of N. Y., New York, N. Y.

Sandow—Sandow Motor Truck Co., Chicago, Ill.
Sanford—Sanford Motor Truck Co., Syracuse, N. Y.
Schacht—G. A. Schacht Motor Truck Co., Cincinnati, Ohio.
Schwartz—Schwartz Motor Truck Co., Reading, Pa.
Selden—Selden Truck Corp., Rochester, N. Y.
Service—Service Motor Truck Co., Wabash, Ind.
Shaw—Walden W. Shaw Livery Co., Chicago, Ill.
Signal—Signal Motor Truck Co., Detroit, Mich.
Standard—Standard Motor Truck Co., Detroit, Mich.
Sterling—Sterling Motor Truck Co., Milwaukee, Wis.
Stewart—Stewart Motor Corp., Buffalo, N. Y.
Stoughton—Stoughton Wagon Co., Stoughton, Wis.
Sullivan—Sullivan Motor Truck Corp., Rochester, N. Y.
Superior—Superior Motor Truck Co., Atlanta, Ga.

Texan—Texas Motor Car Asso., Fort Worth, Tex.
Tiffin—Tiffin Wagon Co., Tiffin, Ohio.
Titan—Titan Truck Co., Milwaukee, Wis.
Tower—Tower Motor Truck Co., Greenville, Mich.
Traffic—Traffic Motor Truck Corp., St. Louis, Mo.
Transport—Transport Truck Co., Mt. Pleasant, Mich.
Triangle—Triangle Motor Truck Co., St. Johns, Mich.
Triumph—Triumph Truck & Tractor Co., Kansas City, Mo.
Twin City—Twin City Four Wheel Drive Co., Inc., St. Paul, Minn.

Union—Union Motor Truck Co., Bay City, Mich.
United—United Motors Co., Grand Rapids, Mich.
U. S.—United States Motor Truck Co., Cincinnati, Ohio.

Velie—Velie Motors Corp., Moline, Ill.
Victor—Victor Motor Truck & Trailer Co., Chicago, Ill.
Vim—Vim Motor Truck Co., Philadelphia, Pa.

Walker—Walker Vehicle Co., Chicago, Ill.
Walter—Walter Motor Truck Co., New York, N. Y.
Ward—Ward Motor Vehicle Co., Mt. Vernon, N. Y.
Ward La France—Ward La France Truck Co., Inc., Elmira, N. Y.
Watson—Watson Wagon Co., Canastota, N. Y.
White—White Co., Cleveland, Ohio.
White Hickory—White Hickory Wagon Mfg. Co., Atlanta, Ga.
Wichita—Wichita Falls Motor Co., Wichita Falls, Tex.
Wilcox—H. E. Wilcox Motor Co., Minneapolis, Minn.
Wilson—J. C. Wilson Co., Detroit, Mich.
Winther—Winther Motor Truck Co., Kenosha, Wis.
Witt-Will—Witt-Will Co., Inc., Washington, D. C.
Wolverine—American Commercial Car Co., Detroit, Mich.

NEW COMMERCIAL CARS

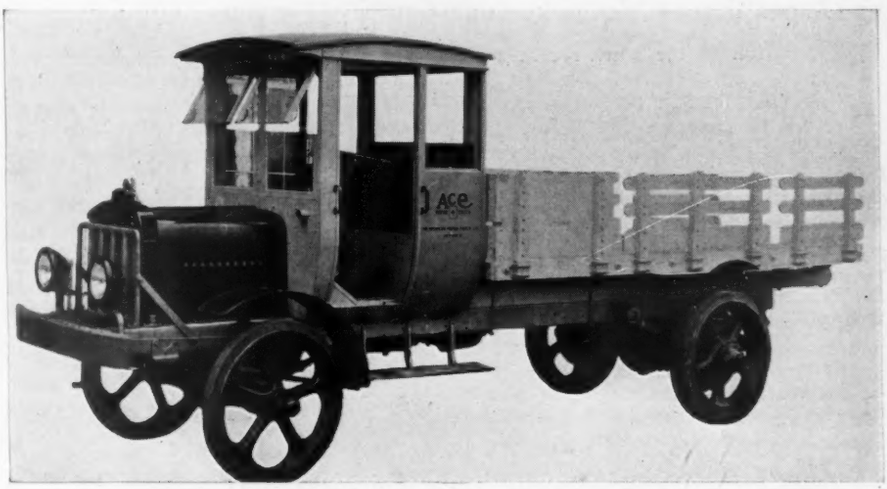
American Motor Truck Company Augment Their Line With New One and a Half Ton Model

THE new 1½-ton Ace truck which has been recently announced by the American Motor Truck Co., Newark, Ohio, embodies many of the effective features found in the earlier models.

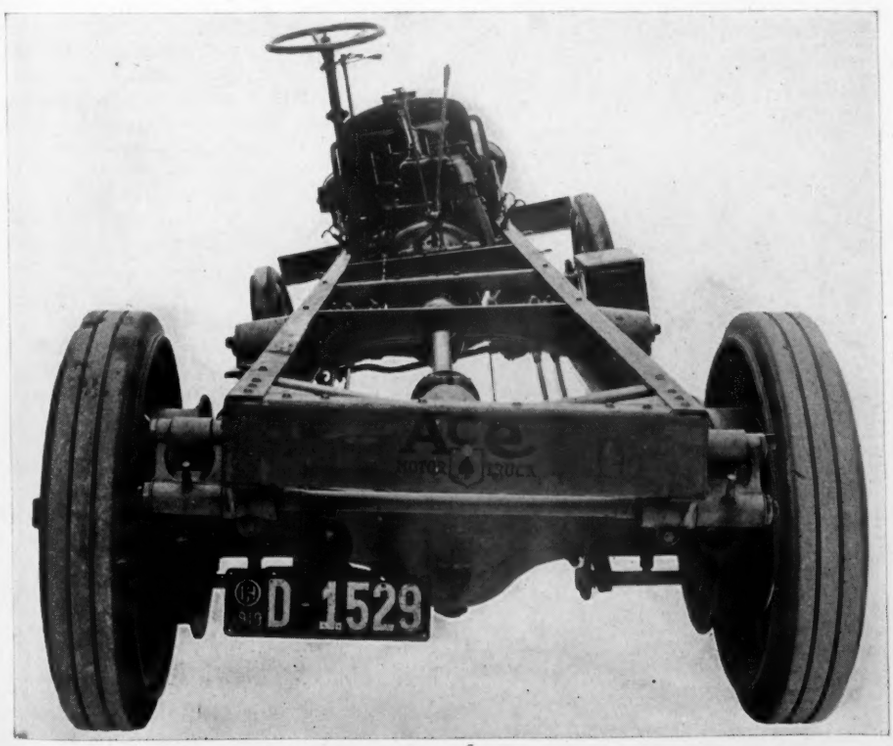
In the assembly of this truck only standard parts, the quality and durability of which have been thoroughly tested by the company, are used. The controlling idea is utility—permanent, dependable, economical usefulness. An unusual feature of this truck is that of perfect parallelism between frame, drive shaft and all brake rods. The object of this design is to insure positive action, greater strength and better adjustment. As the drive is absolutely direct, no power is lost through universal joints, except at the moment of road shock, the power is delivered in a straight line from the crankshaft to the worm gear.

Anticipating the standard that soon will be universal, the company has a complete equipment of all essential auxiliaries to be included as part of the truck.

The Buda WU type engine with a 3¾ in. bore and a 5⅛ in. stroke, capable of developing a 30 brake hp. at a speed of 1200 r.p.m., is used. It is a four-cylinder L-head type engine, cast in block with valves on the right side. All working parts are enclosed. It is mounted by three points in a suspension frame, the rear motor supports resting on a complete universal joint which is designed to protect the motor legs against breakage. Ignition is by means of an Atwater-Kent distributor, Westinghouse generator and Exide battery, while the gasoline fuel is fed to a Wheeler & Schebler model A carburetor, which is equipped with a hot air attachment and dash control by gravity from a 20-gal. pressed steel Terne-plate tank. The cooling system includes a Modine Spirex sectional radiator. This radiator is very practical, as a damaged section can be replaced at any minute at a small expense without removing the entire radiator. If a new section is not at hand, the truck can proceed simply by stopping the circulation from the damaged section and making the repair later. It is protected by heavy cast steel guard. The cooling water circulation is thermo syphon. Oiling is through a force feed system with a gear pump. The frame is made up of Parish & Bingham pressed steel, the vertical section of which is 6 in. The full length flange is 2¾ in., the stock 3-16 in.



This Truck is Well Equipped. Note the Large, Roomy Cab and the Arrangement of Stakes on the Platform



Rear View of the Ace One and a Half Ton Truck, Showing Flexibility of Frame

Power is transmitted through the Brown-Lipe transmission, which is in unit with the engine, and can be regulated to three speeds. Clutch is of same make and of the multiple dry-disc type. The drive shaft consists of three Spicer universal joints, one of which is in the front and the remaining two are in the rear of the transmission with tubular propeller shafts.

Complete steering control is obtained through a Ross steering gear having a left hand drive and a right hand control.

Double ball thrust bearings are used. It is controlled by a Brown-Lipe gear shift lever and an emergency brake, which is in the center. Both the front and rear axles are either of Stan-Par or Timken make. Braking action is obtained from a double internal expanding brake. The brakes are 1¾ in. wide, expanding on rear wheel drums 15⅝ in. in diam. The service brake is operated by a pedal and the emergency brake by a hand lever. The wheels are wood and are equipped with Firestone tires, 34 x 3½ in the front and 34 x 5 in the rear.

The equipment includes two electric headlights, tail light, all-weather cab, jack, set of tools, oil can, Veeder hub odometer, self starter and mechanical horn. The wheelbase is a standard 144 in.; tread, 58 in. front and 57½ in. rear; maximum speed, 16 m.p.h., and the total weight is 4800 lb.

Garford Announces New Three and a Half Ton Truck

Disposition of Motor Varies Slightly, Has Short Wheelbase

IN addition to the truck recently announced, Model No. 25, that had been described in the October issue of the COMMERCIAL CAR JOURNAL, the Garford Motor Truck Company, Lima, Ohio, still further amplifies the company's slogan, "motor trucks for every purpose," with another new model of 3½-ton capacity.

This latest model is not intended to displace the former 3½-ton truck, as both will be available, affording two models of similar capacity from which to select. The new model differs from the former in that the engine is placed forward instead of under the seat and that the one is of conventional wheelbase, and the other has a short wheelbase. This variance in construction is a feature, as it greatly increases the possibility of adapting a Garford 3½-ton truck for practically any purpose in the 3½-ton field. It embodies all those high standards of material and processes of manufacture employed by the Garford Company in all its trucks. It was built to handle effectively the heavier tasks in all fields of hauling.

The 4-cylinder engine has a bore and stroke of 4½ in. by 6 in., respectively, and a detachable head. The cylinders are of gray iron, are cast in block and of the L-head type. The valves are on the right side and ample water jacketing is provided around the cylinders and valves.

The crankshaft is of the 3-bearing type. All journals are large in diam. The shaft is made especially stiff to resist "whipping" and the crankcase is extended to form a housing for the flywheel. The oil-base is of two-piece construction, which permits of easy removal when necessary.

The pistons are gray iron and have three rings each and are 6¼ in. long. The timing gears are large with a width of 1½ in. and are helically cut.

The camshaft is a drop-forging. The cams are semi-offset from the valve-lifters. The lifters are retained in the case by a yoke which permits of very ready removal. The crankshaft and connecting rod bearings are bronze-backed, babbitt-lined.

Lubrication is by force-feed. A large gear pump delivers oil under pressure to all bearings. The timing gears are lubricated by the overflow. The oil is thoroughly cleaned before being admitted to the oil-pump by passing through a fine brass screen. Wherever possible the oil is delivered through steel tubes in order to obviate the possibility of leakage through porous castings.

The power of the engine is transmitted through a multiple dry-disk, ball bearing type clutch inclosed in a housing which registers with the flywheel housing. The selective sliding gear transmission provides four speeds. All gears and shafts are made of alloy steel, heat treated. Gear reductions provided are as follows: 4.84, 2.82 and 1.76 and direct. The arrangement of the transmission is such that a power drive attachment may be applied to it at slight additional cost.

The drive is transmitted to the rear axle from the transmission through a tubular drive shaft and all-steel universals of large dimensions. They are also all oil-tight and dust-proof. The main drive is through worm and worm gear in the rear axle housing. The bearing equipment of this unit is much heavier than in previous models. The axle is of the full-floating type, each wheel being supported on two bearings on tubular extensions from the axle housing. The driving wheel brakes are of the double internal type, no external brakes being required. The size of the drum is 21 in. in diam. by 3¾ in. in width.

The front axle is of conventional pattern. It is an I-beam drop-forging, heat-treated. The knuckles are of alloy steel, also drop-forged and heat-treated.

Ignition is effected by means of a high-tension magneto. The elimination of a secondary source of current greatly simplifies the wiring.

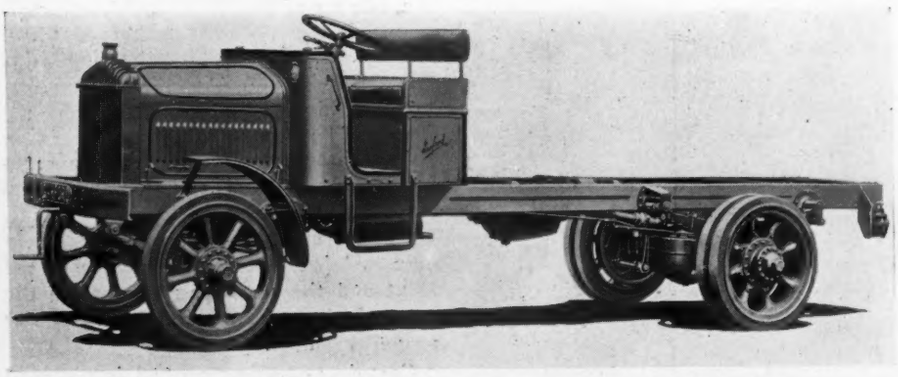
The carburetor is of the automatic-feed type of plain tube construction. The engine is provided with a governor that can be adjusted to limit the maximum speed to any desired mileage. Fuel feed is by gravity from a cylindrical tank of 25 gal. capacity, mounted under the driver's seat.

The screw and nut irreversible type steering gear is mounted ahead of the engine leg. The angular position of the column provides for a comfortable position when driving. The steering connections from the gear to the front axle are of the ball and socket type and compression springs are provided at both ends of the rod. The hand wheel, which is 22 in. in diam., is notched.

The semi-elliptic springs are entirely of alloy steel. The front springs are 42 in. long and 3 in. wide—rear, 56 in. long and 3½ in. wide.

The transmission system is geared for a speed of 14 m.p.h.

Ready attachment of an electric generator and electric starter when desired is facilitated by flanges on the crankcase which are of the S. A. E. Standard No. 2 type, to which they can be easily bolted. Throughout the building of the engine, standards have been followed wherever possible. The price on the new 3½-ton model is $3990.



The Engine is Placed Forward in This New Model. There is Also a Difference in the Length of the Wheelbase as Compared With Other Model

Correction

In the October issue of the COMMERCIAL CAR JOURNAL, a discrepancy in the address of the Standard Motor Truck Co. was inadvertently made in a description of its new one-ton truck on page 45. The address given was Warren, Ohio. It should have been Detroit, Mich.

Chain Products Co., Cleveland, O., has issued a new illustrated catalog which gives some very interesting and valuable information about the manufacture and uses of the chain. The company will be glad to send you a copy if you are interlubricated is clearly marked with the ested in the weldless chain.

New London Omnibus Chassis is Revision of the Earlier Type

Improvements in This Bus Increased Its Carrying Capacity Thirty-Five Per Cent, and at the Same Time Decreased Its Weight

By Our BRITISH CORRESPONDENT

THE first of a new type of motor bus, which has just been passed by the London Police, and has appeared on the streets of the British capital, affords one of the most instructive designs that has ever appeared, because it represents the outcome of the longest and largest specialized experience in the world.

Reduction in Weight Demanded

It was in London that the motor omnibus was extensively developed in its earliest days. For the first three years or so the conveyances were permitted by the law of the country of an unladen weight of 5 tons, but the noise and road damage caused by these big machines raised such a tremendous outcry that a change in weight became pre-emptory.

These three years, however, afforded sufficient experience for the consulting engineer to the Police authorities to decide that the weight of these vehicles could be materially lessened, and about 1908 an order was issued by the London Police to the effect that all buses coming to them for licenses to be operated in London would have to come within an unladen weight limit of 7840 lb. At the time this caused much perturbation. Manufacturers and operators said it could not be done, but the Police authorities were right, and after only one semi-successful attempt the X type, of which about 100 were built, the London General Omnibus Company produced what was known as the famous B type, which has done more than any other design towards the development of street passenger transit. The B type, described in one of the very early issues of the C. C. J., carries a regular complement of 16 passengers inside and 18 out, yet even so the Police were not satisfied. Even on the well-built macadam roads throughout London and its suburbs regular services of these vehicles caused severe wear, which generally took the form of "pot-holes" at irregular intervals, making travel at a nominal speed very uncomfortable. Consequently about two years ago, enquiry was set on foot to see what further steps could be effected in weight reduction, and the present type, known as the K. I., is the result.

Comparison of the Old to the New

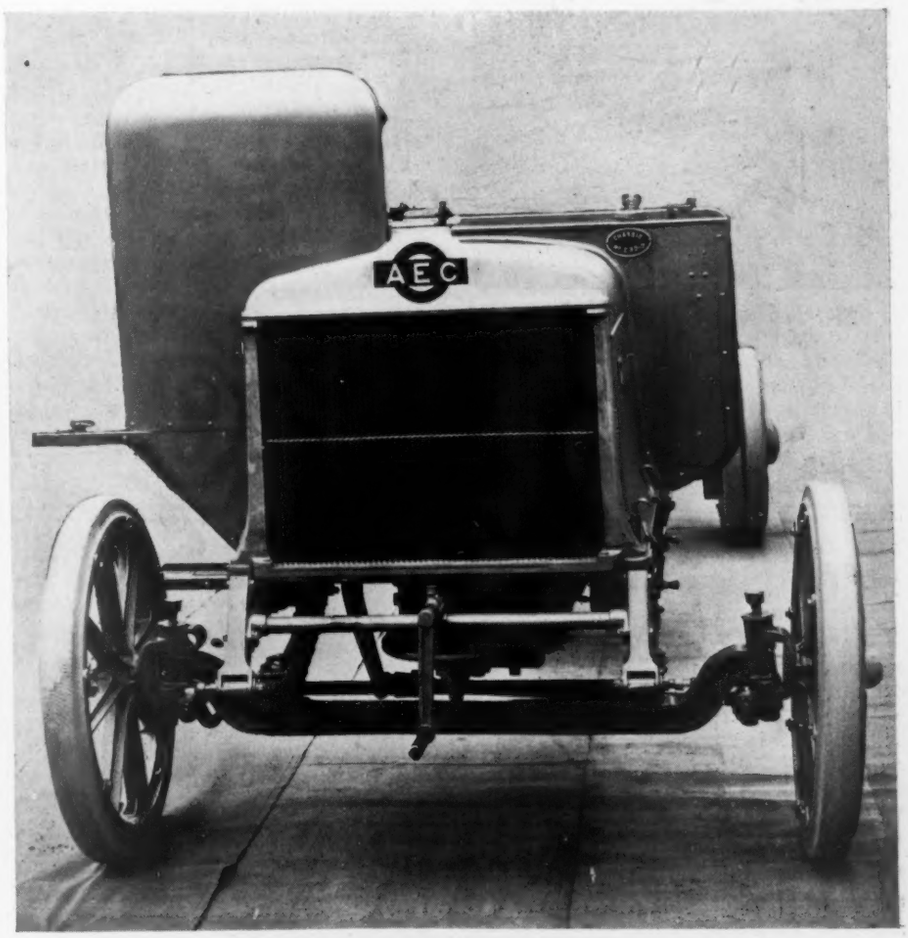
It is most instructive to see how it compares with its predecessor. The chief point is that while it is lighter, it is yet able to carry 35 per cent. more passengers, carrying 46 all told, 22 inside and 24 outside. The extra body length is obtained by placing the driver alongside of the engine.

The ordinary London bus is merely provided with a long seat along each side of the interior. In the new vehicle most of the seats are placed across the body and the passengers sit facing the direction of travel. Each seat accommodates two passengers and with an aisle down the middle, there is room for four in each row. Four of these pairs seat 16 passengers; the remaining 6 are accommodated on longitudinal seats facing each other, as in the older bus. With this cross-seating arrangement the well type of body has been, of course, superseded, therefore in the new vehicles we have a flat-sided body with a race formed at each side for the back wheel. At the back, too, greater length is allowed for the platform, which is practically divided by a vertical rail so that outside and inside passengers need not get in each other's way on entering. It is claimed also that by this arrangement the driver, placed as he is well to the right of his engine, has better command of his vehicle.

Some Motor Points

In the engines of some of the earlier B type the sliding sleeve valve was employed, but perhaps due partly to the difficulty of starting large sleeve valve engines in cold weather, it was replaced by ordinary poppet or mushroom valves on the new machine. All valves are on one side, and the cylinders, which are cast in pairs, have a bore of 3 15-16 in. and a stroke of 5½ in. Aluminum split skirt pistons are used; also the gudgeon pin is clamped to the connecting rod and swings in the piston bosses.

The old arrangement of pump and trough lubrication is retained, the oil level being maintained by a pump driven through skew gear off the crankshaft.



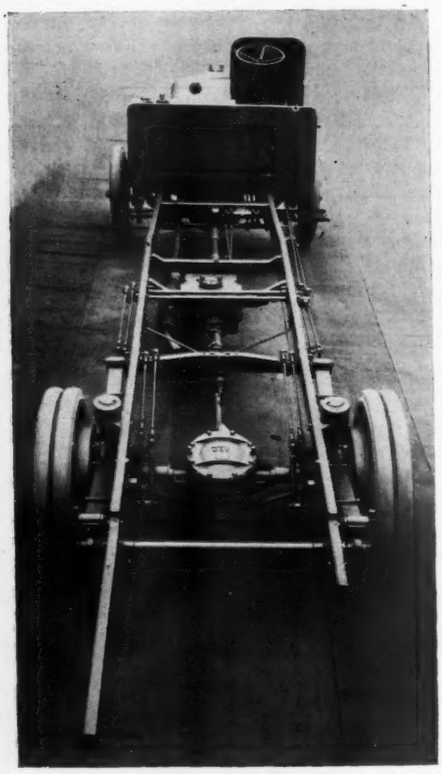
Front View of New Bus Chassis

In this the drag link and its lever lie transversely across the frame. The lower header tank of the tubular radiator is very small in this model

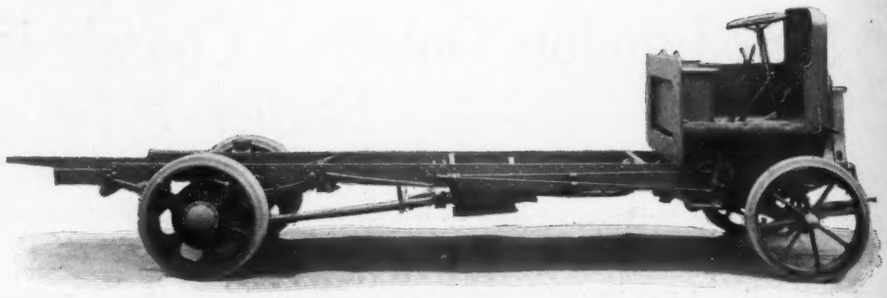
Another point—in the crankcase, which is of the extended type, the bottom face joint is well below the crankshaft center. Throughout, very extensive use is made of inverted chain transmission, and on the engine, not only are the camshaft and magneto chain driven, but also the water pump. The camshaft and magneto are arranged for a three-point drive from the same chain and the water pump is driven by separate chain from the magneto shaft.

Chain Subsidiary Transmission is Used

In the gearbox also the inverted tooth chain has been retained as in the former design, but much weight has been saved in this unit. Three speeds and a reverse are available, each being brought into operation by a dog clutch.



End View Shows Back Extension of Chassis Frame for Platform



This is the New London Bus Chassis, With the Driver's Seat Beside the Engine, to Leave Length Available for Additional Passengers. It Has Under Worm Drive

A multiple dry plate clutch has replaced the old cone clutch. These are riveted to outer steel plates, but as an alternative, floating Ferodo discs have been fitted.

Disk Universal Dropped

The leather or Hardy fabric disk universals have been abandoned for very substantial ball bearing universal joints. Instead of an overhead worm, in the new model, an underslung worm drive is used, giving a reduction of 1 to 8.25.

The back axle has been much lightened by employing a cast center, and forming its arms of tubes pressed into this central casting. The driving torque is taken by a spring plate torque rod bolted up solid with the axle case and held at its front end in a spherical bearing with ball cups insulated with rubber gradually come into the deflection as pads; but the direct torque is taken by the springs, which are mounted on floating spring carriers.

The road springs are wider and longer than those existing in the B type, and, in addition, a compound volute spring is arranged at each side of the back axle, so that while the main springs take the weight of the vehicle empty, the volute comes into action as the frame is pressed down on its main springs. There is much to be said for this use of the volute spring, seeing that its action is perfectly graduated and progressive, the larger coils first deflecting under the lighter loads, while the stiffer and smaller coils the load increases.

In the wheels, which run on Timken bearings, an acknowledgment of American practice is to be found, for they are now made both the same size, 36 in. in diam. to take the 770 by 100 mm. tires, singles at the front, duals at the back. It will be noticed from the illustration herewith that the back wheels are more deeply webbed than those in the earlier designs, and the web is formed with flanges along its edges. These deep flanges, with the strong ribbing, have resulted in a lighter wheel. Needless to say, the weight pressure is transmitted from the back wheels to the axle housing and not to the axle shafts.

The braking arrangements are also traceable to the adoption of American methods, for both brakes are on the back wheels, and arranged concentrically, with the hand brake drum within that of the foot brake.

The Old Flitch Frame Holds Its Own

In the B type chassis the frame is of wood reinforced on each side in steel flitch plates, and this construction has answered so well that it has been retained, the only noticeable modification of any size lying in the extensions at the back to accommodate the platform.

Even with the vast experience at the back of the London General Omnibus Company this machine has not been produced without careful experiment, and, in fact, the present vehicle is the last and final of a line of experimental machines that have been most carefully tested under every conceivable condition.

Hoover Three-Quarter Ton Truck

The Hoover Wagon Co., York, Pa., manufacturers of the Hoover line of commercial truck bodies, recently started production on a three-quarter ton Hoover truck. This model is rated to have a capacity of 1500 to 3000 lb. and is equipped with pneumatic tires at front and rear.

This truck is featured by the fact that the Hoover Wagon Co. have facilities to furnish a body to suit the requirements of the buyer.

The following is a résumé of the general specifications:

Engine: Continental 35 hp., 3½ in. bore, 5 in. stroke.

Lubrication: Combination force feed and splash with plunger pump.

Cooling: Thermo-syphon system. Radiator of extra large capacity.

Carburetor: Float feed, adjustable type with starting control and dash.

Magneto: High tension with starting coil.

Radiator: Honeycomb type with extra large cooling surface.

Transmission: Sliding gear. Three speeds forward and one reverse. Center control. Extra large gears with ⅞ in. face.

Clutch: Multiple disc.

Drive: Hotchkiss straight line drive using two universal joints. 1¾ in. tubular propeller shaft.

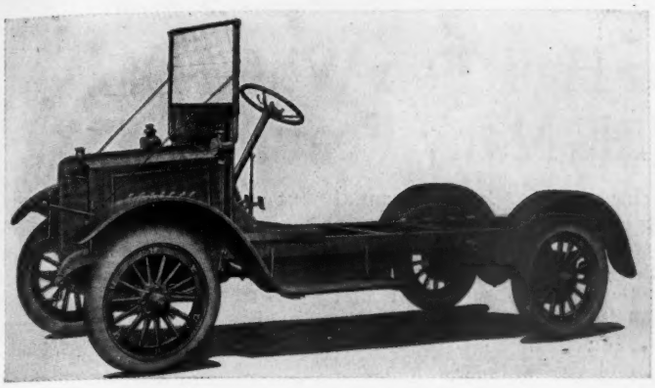
Rear Axle: Sheldon worm gear.

Front Axle: I-beam type with taper roller bearings.

Springs: Semi-elliptic with bronze bushings. Front, 2 in. nine-plate, 40 in. long. Rear, 2½ in. eight-plate, 52 in. long.

Wheels: Artillery type. 14 spokes front and rear. Demountable rims.

Tires: Interchangeable 32 x 4 in. front, 33 x 4½ in. oversize rear.



Side View of the New Hoover Three-Quarter Ton Truck. Wheelbase 120-Inch and Pneumatic Equipped.

Brakes: Service and emergency, internal expanding on rear wheels. Extra large braking surface.
Frame: Pressed steel hot riveted.
Steering: Irreversible type.
Wheelbase: 120 in.
Fenders: Pressed steel. Front and rear fenders furnished with each chassis.
Standard Equipment: Oil dash and tail lamps. Hand horn. Complete set of tools. One spare rim. One tire carrier. Hubodometer. Double ventilating windshield.
Painting: Wheels, canary yellow; balance of chassis black.
Body Equipment: The company's facilities enable them to furnish any body required by a customer.

Graham Offers Specially Designed Farm Truck

A 3¾ x 5 Inch Engine Developing 22.5 S. A. E. Horsepower is Used

THE production of the Graham Brothers, Evansville, Ind., is devoted exclusively to labor saving machines and devices that excel the horse in performance. The three products, the farm tractor, motor cultivator and farm truck, comprise the complete power farming line of this company at the present time.

This complete line was first shown in the Central States Tractor Sales Show in Evansville, October 14th to 24th. Much interest was exhibited by the farmers, as the company demonstrated how satisfactorily this line could cover the varied demands of farm service.

The truck being pneumatic tire equipped, permits of extensive work on the farm proper, such as hauling sheaves of wheat to the separator, threshed grain from the separator, green corn to the silo, or hay to the barn and stack. This equipment also enables the truck to negotiate fields and poor roads, with comparative ease.

A unit power plant is used in the Graham truck. The engine is rated at 22.5 S. A. E. horse power. It has a bore and stroke of 3¾ and 5 in. respectively, and is a four-cylinder, L-head type, cast in block. The elimination of strain on the crankcase through frame distortion is said to be obtained by a flexible spring type suspension. The crankcase, which is of heavy construction, has three main bearings.

A thermo-syphon cooling system is used. This includes a radiator of the fin and tube type with removable core, incased in a pressed steel shell. The radiator suspension is also of the flexible spring type.

The power of the engine is transmitted through a multiple dry disc clutch. The transmission is the sliding gear selective type, with three speeds forward and one reverse. All gears are nickel-alloy steel, heat treated and hardened. They have a ⅞-in. face. The gear ratios are as follows: First, 1:1; second, 1.7:1; third, 4:1; reverse, 3.5:1.

The drive is transmitted to the rear axle from the transmission through a propeller shaft, consisting of two shafts, which are connected at their ends by three universal joints. This shaft is supported in the center by a heavy bracket, containing self-aligning double row ball bearings. The final drive is through a Torbensen internal gear.

Ignition is through a high-tension magneto-generator. A Stromberg 1-in. carburetor with a hot air stove and dash air adjustment is used. Speed of engine is controlled by Monarch governor.

Fuel is fed by gravity from a terne-plate, soldered, lock-seamed type tank, with a trap to catch sediment and with a capacity for 19 gal. of gasoline. The sediment trap has an extra valve and double inlet with pipe extension into tank to act as reserve tank space.

Chassis suspension is on semi-elliptic springs. At the rear the springs are 52 in. long and 3 in. wide and consist of 12 leaves. At the front they are 42 in. long and 2¼ in. wide and consist of 9 leaves. The rear end of the spring is single shackled.

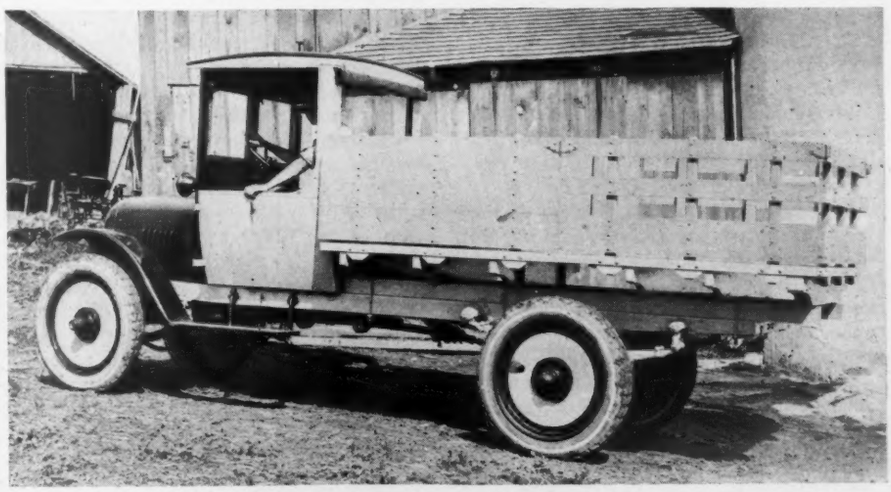
The front and rear wheels are Disteel solid pressed steel disc type. Pneumatic cord tires, 35 x 5 in. front and 36 x 6 in. in the rear, are provided.

The service brakes consist of two double-acting external, contracting on a 15-in. drum, 2½ in. wide; two emergency brakes which are double-acting internal, expanding on a 14½-in. drum, 2 in. wide.

Steering is through a "Lavine" worm and split nut type gear. The steering wheel, which is located on the left side, is 18 in. in diameter.

The chassis includes a cab capable of seating three men in a seat. This seat has a 7-in. spring cushion and thick back pad. The back pad is tilted at a comfortable angle. The windshield is divided in the center to open to the right or left side singly, as desired. It is equipped with a side and rear curtain. Forward side curtains on both sides of the cab swing open with the doors and are reinforced at the rear end by a steel rod fastened rigidly to the door. In closing the doors, the curtains snap under a weather strip at the top of cab.

This model is thoroughly standardized. A full set of tools, jack, 6-in. electric head lamps, electric tail lamp with license bracket, electric horn, Prestolite battery and front fenders are included with the chassis. The wheelbase is 133 in. The tread is 56 in.



New Graham One and a Half Ton Truck is Pneumatic Equipped. Note the Heavy Construction, the Cab and the Body

New Jackson Three and a Half Ton Wheel-Drive Truck is Replete With Many Features

JACKSON Motors Corporation, Jackson, Mich., hitherto identified chiefly with the manufacture of passenger cars, is in the market with a four-wheel-drive truck, listed as Model B, that promises to be a live competitor in this field. Although war work held up production, it gave opportunity for extended tests of the truck, and now that the government contracts have been cleaned up the company is back on a peace footing with a truck of known ability.

Realizing that at this time a four-wheel-drive truck must sell itself on its hauling ability, the Jackson Motors Corporation has built a machine that looks capable of withstanding any conditions that could be encountered. The truck has a nominal 3½-ton rating, in addition to the body allowance of 1000 lb., and the chassis complete weighs 7400 lb., indicating that there has been no false economy in the way of material. It is a combination of standard units and special parts, the latter being built by the company in its own shops. In fact, it is to a large extent a Jackson Motors Corporation product.

The oustanding feature of the truck, of course, is the four-wheel drive, which has been worked out effectively, with a transmission and axles of the company's own make. The transmission is of selective sliding gear type, four speeds forward and reverse being provided, in keeping with the accepted practice in heavy-duty trucks. The transmission, located amidships, is enclosed in a substantial housing that has three-point suspension directly on the main frame. Power is transmitted from the gear-set to the propeller shafts, located slightly to the left of center, by a 5-in. wide by 1-in. pitch alloy steel silent chain, operating in an oil-tight housing integral with that containing the gearset. The assembly is very compact, and at the same time every point is readily accessible. Middle differential has a locking device subject to the will of the operator.

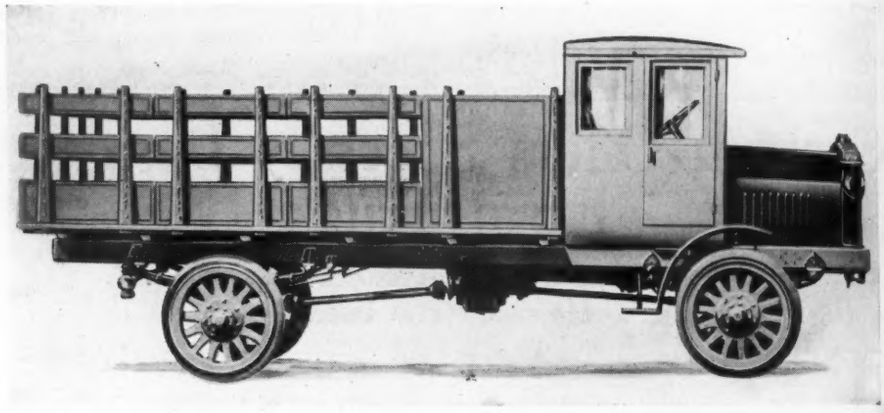
Drive from the propeller shaft to the axles is by means of heavy shafts, each carrying two universal joints. Housings containing the differential and axle gears are of generous size, so designed that if necessary they can quickly be dissembled. They are located well to the left side of the axles, and the gears they contain are of ample size. Gear reductions from engines to axles are: First speed, 43.5; second, 26.9; third, 14.8; fourth, or direct, drive, 9.2. With the governor set at 12 m.p.h. in high, the several speeds are: First, 2.5 m.p.h.; second, 4 m.p.h.; third, 7.5 m.p.h.; fourth, 12 m.p.h., and reverse, 2 m.p.h.

Full floating axles, the company's exclusive design and manufacture, are used at front and rear. A feature of the front axle is a patented knuckle yoke and hollow spindle head that excludes all dirt and acts as an oil receptacle, insuring perfect lubrication at this essential point. Wheel bearings are Timken, only one size being used, which makes them interchangeable. Gurney annular ball bearings support the gears and shafts, these being of a size that insures long life.

A Continental Red-Seal Type E-4 motor furnishes power. It is the conventional four-cylinder type, with 4½-in. bore and 5½-in. stroke, and is supported at three points on the main frame. Lubrication is through a combination pressure-feed and splash system. A Pierce governor on the intake manifold is set to control the engine to a standard 12 m.p.h. in high. Carburetion is through a 1¼-in. Stromberg Model M, fitted to a hot-spot manifold. Cooling is by means of a vertical finned-tube type radiator that also serves to set the front of the truck off properly. The clutch is a 12-in. Borg and Beck single plate type, mounted on annular ball bearings.

In point of electrical equipment the Jackson leaves nothing to be desired. Ignition is supplied from an Eisemann high-tension magneto. Mounted integrally with the magneto, and driven by the same shaft, but entirely separate in its functions, is a 6-v. 10-amp. direct current generator and cutout, the disposition of these two units in their relation to the other parts being well planned. Bendix drive is used on the starting motor, meshing directly with gear teeth cut in the flywheel, and eliminating any intermediary agencies.

A storage battery designed especially for truck service, with 105-amp. hr. capacity, furnishes current for the starting motor and the lights, of which there are double-bulb electric head-lamps and electric tail-lamp of vibration-proof construction, as well as a dome lamp in the driver's cab. Which brings us to this essential but often overlooked item. Everything possible for the comfort of the driver has been incorporated, in addition to self-starter and lighting system that is controlled from inside. The cab is fully enclosed. The seat has deep springs and is substantially upholstered. There is a trouble lamp with sufficient cord to reach any part of the machine for inspection of a load at night. In the lower forward section of the cab small windows are placed so that the driver, without shifting his position, can determine the exact position of the front wheels. The specially designed steering knuckle permits placing the column at such an angle that the driver, leaning back in his seat, steers from the same relative position as he would in a passenger car, and with corresponding ease. The Ross steel screw and solid nut type irreversible steering gear is used.



This Three and a Half Ton Four Wheel Drive Jackson Truck Has a Transmission and Full Floating Axles of Own Design. Solid Tire Equipment

The Jackson has a standard 150-in. wheelbase, with 130-in. optional for dump bodies. The frame is of pressed steel channels, the side rails being 7 in. deep, with 2½-in. flanges. There is a 150-in. clearance back of the cab. Springs are full vanadium alloy, 3 in. wide, bronze bushed, with Hotchkiss drive, and special wrapped eyes on front ends. The forward springs are 48 in. long, the rear 52. Wheels are of substantial design, in keeping with the rest of the truck. They have 14 3-in. square spokes, with Goodyear 36 x 7 in. solid pressed-on tires front and rear. Twenty-in. internal expanding brakes with 3½-in. face are located in the rear wheel drums, and an external contracting brake 10 in. in diam., with 3-in. face, on the transmission shaft provides an emergency brake on all four wheels, a hand lever conveniently located being the actuating medium. Fitted with a stake body, the standard equipment, the Jackson Four-Wheel-Drive truck sells for $4250 f.o.b. Jackson, Mich.

New Schacht Five-Ton Truck Provides Ten Speeds

New 4½ x 6 Buda Engine is Used. Final Drive is Through a Worm Gear of Own Make

SOMETHING distinctly new in heavy duty motor truck design is offered by the G. A. Schacht Motor Truck Co., of Cincinnati, in a ten-speed transmission, which is incorporated in the five-ton model. There are eight forward and two reverse speeds with a wide range of power reduction that will not only permit a high rate of vehicle speed, but also provide tremendous pulling power on low and intermediate gears.

The fundamental principle of the Schacht ten-speed transmission is to enable the five-ton truck to attain a high vehicle speed when conditions justify without the dangerous engine speed which has sometimes been the cause of much trouble.

The gear ratio in the average five-ton truck will not permit a high rate of vehicle speed, and in order to attain a speed of even fourteen or fifteen miles per hour when running empty or when operating over good level roads, which the operator will invariably attempt to do, necessitates running the engine at a dangerously high rate of speed, which causes it to wear out prematurely. The consequent vibration when running the engine at a high speed also puts a strain on other chassis parts and a quick deterioration is the natural result.

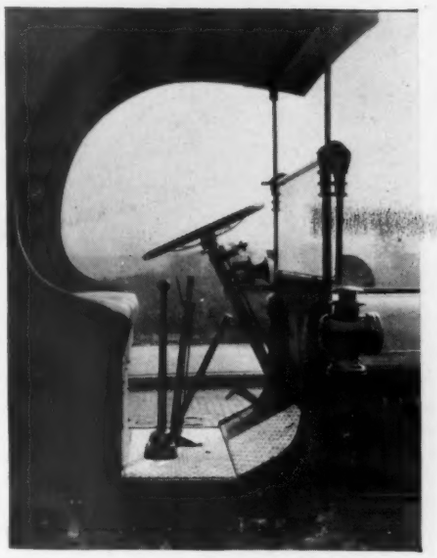
The Schacht five-ton truck with ten-speed transmission is capable of attaining a speed of twenty miles per hour at an engine speed of only 1000 r.p.m. It is immediately apparent that the efficiency of the truck is increased two-fold, since it can do more work in a given time and in addition cost less to operate. The uniform engine speed of 1000 r.p.m. assures maximum life and efficiency.

The ten speed reduction enables the power of the engine to be more closely adapted to the requirements of the going. It provides sufficient power reduction to pull the truck anywhere, whether sand or mud, provided the wheels can get traction. Faster traveling up grades is possible, as the reduction that is exactly adapted to the hill can be used.

The main transmission has four speeds —first, second, third and fourth. The secondary transmission provides an extra reduction and can be used in connection with any one of the five regular speeds—so that there is a lower first, second third, fourth and reverse.

There are only two movements of the auxiliary gear shift lever—backward and forward. Thus the construction is just as simple as with the regular four-speed transmission.

This new model obtains its power from a new Buda engine with a 4½-in. bore and a 6-in. stroke. This engine has been especially designed to stand the strain of increased speed and load carrying capacity. It is simple and accessible, so that the average driver or repairman can keep it in good condition with a minimum of time and effort. The speed of the engine can be limited to any rate of speed by a Duplex governor. Power is transmitted through a Hartford multiple dry disc clutch to the worm-drive rear axle, which is exceptionally heavy and sturdy. It is made by the company, as is 90 per cent. of the entire truck, including frames, steering gears, transmissions, control sets and radiators.



There Are Two Movements of the Auxiliary Gear-Shift Lever, Forward and Backward

Lubrication is of the full force pressure feed to all crank and camshaft bearings through drilled crankshaft pistons and the cylinders are lubricated by oil thrown from the lower ends of the connecting rods.

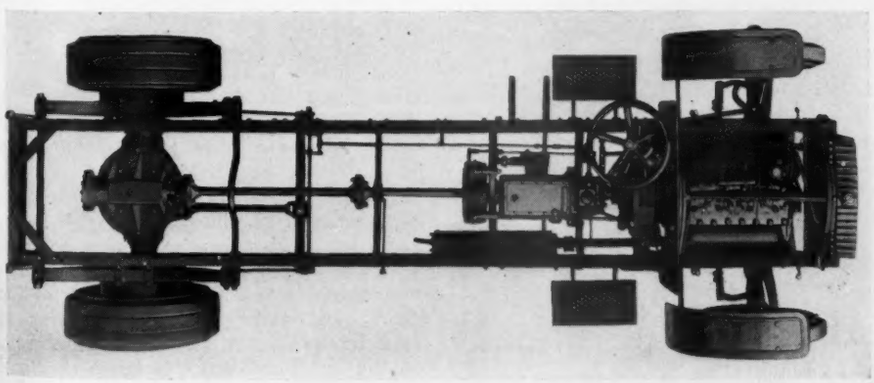
Ignition is through high tension Bosch magneto and fuel is fed by gravity through a Shebler carburetor, which has an outlet of 1¼ in.

The springs are of National make. The wheels, which are manufactured by the St. Mary's Wheel Co., are wood, this type being found on all the Schacht models.

It is solid tire equipped, having 35 x 5 singles at front and 40 x 6 duals at the rear.

The wheelbase may be either 156 in., 168 in. or 180 in., with a relative distance behind the driver's seat of 140 in., 152 in. and 176 in., respectively.

The width of the frame is 35¼ in.



Airplane View of the Ten Speed Five-Ton Schacht Truck

Louisiana-Mississippi Association Holds Convention

JACKSON, MISS., Oct. 25.—The second semi-annual convention of the Louisiana Automotive Trades Association, which was held here on October 9 and 10, proved to be the largest gathering of men interested in the automotive industry ever held in the South. There were between 500 and 600 delegates present. The next convention will be held at Lake Charles, La., March 17 and 18, 1920.

The convention was devoted almost exclusively to work, practically the only play being automobile rides over some of Mississippi's new roads. A great deal of time was devoted to the discussion of the troubles and problems of the auto dealer, the supply man, the tire agent, the vulcanizer, the garage man, the battery station owner and all others connected with the industry.

Robert L. Morrison, of Birmingham, Ala., spoke on good roads and developed a plan whereby greater co-operation might be obtained by the dealers of Louisiana and Mississippi.

During the convention the executive committee met and formulated plans for the coming six months. The morning of the tenth was devoted to addresses by men well known to the trade and by round table discussions of many of the problems that are playing an important part in the present day success of the auto trade.

New Hydraulic Hoist for Dump-Bodied Trucks

THE Hydro Hoist, the latest improved type of power hydraulic hoist, is being produced by the Heil Co., Milwaukee, Wis., builders of the recognized Quality Dump Bodies. Since the Heil Co. has taken over the Hydro Hoist many improvements have been made in the design, method of construction and manufacture. At present it is built in three sizes, No. 4, No. 5 and No. 7. The Nos. 4 and 5 are two cylinder hoists; the No. 7 is a single cylinder and was designed expressly for the Nash Quad and F. W. D. trucks.

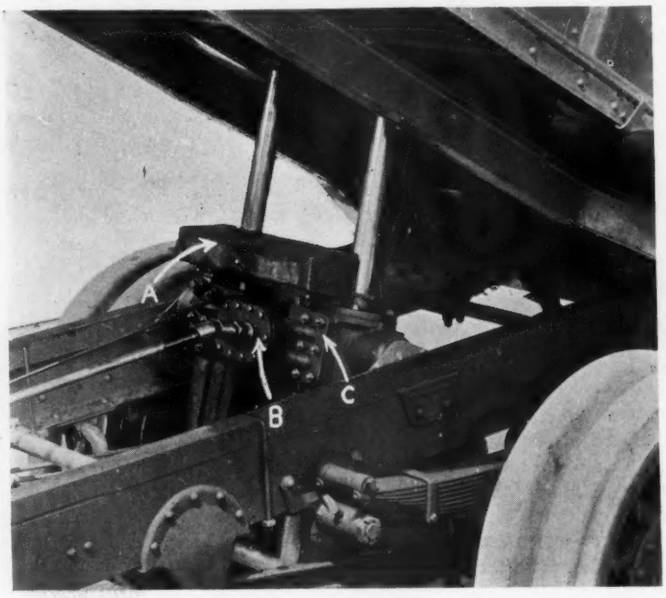
The hoist consists of a vertical cylinder or cylinders containing a piston or pistons driven by oil pressure, which pressure is furnished by a gear pump. The pump case and manifold form one of the rigid members connecting the cylinders, an iron channel in back of the manifold and a tie bar at the bottom of the cylinders complete the tie members. The power to drive the pump is taken from a power take-off or extended countershaft on a unit power-plant type of transmission, or by fitting a special cover plate with sliding gears on the amidships transmission. In either case, the power is applied to the pump drive by operating a lever in the driver's seat. The cylinders are swung from saddles mounted on the chassis frame in front of the rear axle. They are so hinged that they will adjust themselves to the angle of tilt as the body is raised, giving a direct lift at all times. Its suspension between the rear spring shackles reduces the strain on the chassis frame. The lifting point has been determined very accurately by expert engineers and the hoist is so mounted that it delivers a dumping angle of approximately 43½ deg. The distance between the pistons is approximately 17 in. so that the tendency of the body to twist when raising a load unevenly distributed or a load with one rear wheel lower than the other is very slight.

The oil is driven by a gear-pump from the upper part of the cylinders through oil-ways to the bottom of the cylinders, forcing the pistons up. An oil-tank is placed above the cylinders to keep them supplied with oil and to insure a flow of oil as soon as the pump starts. The oil tank supplies any wastage and also vents the oil properly. The hoist automatically stops itself when the pistons reach their full stroke. The piston heads moving up the cylinders pass over the oil-intake and so shut off the flow of oil from the oil ways; this automatically stops the hoist. To lower the hoist a valve or stop cock is opened, which allows the oil to by-pass back into the head of the cylinder.

As the piston head stands on a solid head of oil, which oil must be displaced by passing through this valve, the body can come down at only one rate of speed. Even though the drive shaft were disconnected it would not affect the speed at which the body comes down—there is just one speed. It can be stopped at any time by closing the valve. It is said to be absolutely safe for a man to work around or under a loaded dump body equipped with a Hydro hoist. The body can not fall and break a chassis. It comes back to the normal position with positively no shock. There are no cables to break, no pipes to burst, no pulleys to get out of order, in fact it is claimed that there is not a chance for an accident.

The No. 4 Hoist is tested at 400 lb. pressure, the No. 7 to 450 lb. pressure, and the No. 5 Hoist to 500 lb. pressure per sq. in. This is not the maximum pressure that the cylinders can stand, but this pressure is much more than any found in actual working conditions.

The parts are all standardized and interchangeable. All unnecessary parts have been eliminated. The gears are made of high grade steel and ground to size. Every part is a jig product, machined and tested to one one-thousandth part of an inch. The Hydro Hoist allows the dump body to be placed just back of the cab, making use of all the loading space and distributing the load more evenly. A dump body with lower sides for a given capacity can be used with the Hydro Hoist than with a hoist that occupies 18 in. to 29 in. back of the cab. This makes the truck easier to load by hand. It also saves the wear on the truck and tires, because the load is less top heavy. The hoists are also mounted in such a way that they never interfere with ground clearance of truck.



Two Cylinder Hoist
The pump case (B) and manifold (C) form one of the rigid members connecting the cylinders. The oil tank (A) is a reservoir that supplies any wastage.

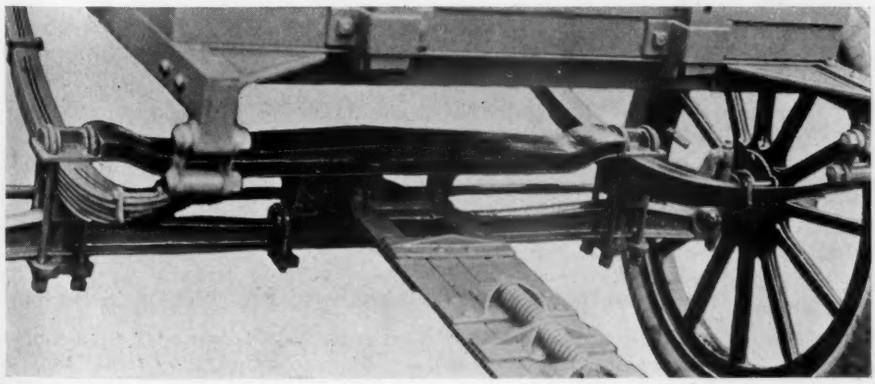
Quality Dump Body, S. S. E. and Number Seven Hydro Hoist, Mounted on a Nash Quad

Warner Manufacturing Company Announces New Stake and Panel Type Trailers

THE Warner Mfg. Co., Beloit, Wis., has started production on two new trailers, namely, Models A. H. No. 20 and A. H. No. 15. The construction of the two models are identical, differing only in capacity, the former being 2000 lb. and the latter 1500 lb. The 32 x 2½ artillery type wheels are equipped with similar sized pressed on solid tires.

Warner One-Ton Trailer With a Standard Stake and Panel Body

These trailers are featured by the Universal ball and socket hitch and by a specially designed auxiliary relief spring attached to the draw-bar to take up the shock transmitted to it in starting or stopping.



Close-up View of Front Axle. Note the Auxiliary Relief Spring Attached to the Drawbar

The body is of the standard stake and panel construction, consisting of side-boards, 12 in. high, to which are bolted four upright posts which not only reinforce the side-boards, but act as retainers, the lower ends of which posts project into keepers which are secured on the edges of the platform. The front and tail boards are identical in construction to that of the side-boards, differing only in that they are supported by two posts instead of four.

The following is an abridged résumé of the Model A. H. 20 trailer:

Length of load space, 92½ in.; width, 36¼ in.; height, 12 in. The frame is constructed of 1½ in. x 2 in. angles; wheelbase, 64¼ in.; front axle is of the I-beam type, drop forged; rear axle is made of 1½ in. round forge steel; track, 56 in.; Bower roller bearings; springs, 1¾ x 36 in., semi-elliptic. Price $390.

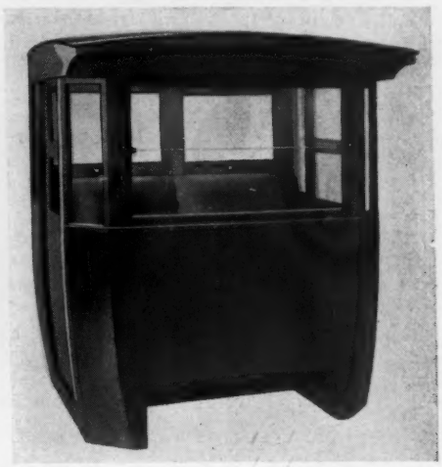
Specifications of Model A. H. 15:

Length of load space, 92½ in.; width, 36¼ in.; height, 12 in. The frame is constructed of 1½ x 2 in. angles; wheelbase, 64¼ in.; front axle, I-beam type, drop forged; rear axle is made of 1½ in. round forge steel; track, 56 in.; bearings, ball and cone type; springs, 1¾ x 36 in., semi-elliptic. Price $355.

Selden Truck Co., Rochester, N. Y., is to have its annual sales conference, including divisional sales managers from all territories in the United States and Canada in Rochester, beginning November 15.

Winter Cab for Trucks

Complete protection from the rain and cold weather, and bodily comfort for the truck driver, are features afforded by the Detroit Weatherproof Truck Cab, manufactured by the Detroit Weatherproof Body Co., Pontiac, Mich. This company has been making some studies of the actual conditions under which these cabs must work, and as a result, it has created and developed a new model, the bay window enclosed type. The combination of wood and a staunch gage metal used in this cab makes it strong, but not too bulky—yet enough durability is put into its assembling to prevent any drumming or rattling. Another thing, the ouside four corners are braced with sturdy angle iron. The inside corners are braced with metal angles which make for greater flexibility.



Front View of Winter Cab. Sliding Windows of Cab Permit of Ventilation

This type cab has new patented doors, with spring steel frames and clean cut Pyroline windows, which slide into the top through deep metal channels. The same accessibility applies to the windows. They slide down into the body of the cab when ventilation is desired. This is a distinct feature for the driver in signaling traffic, as it permits a clear view in any direction.

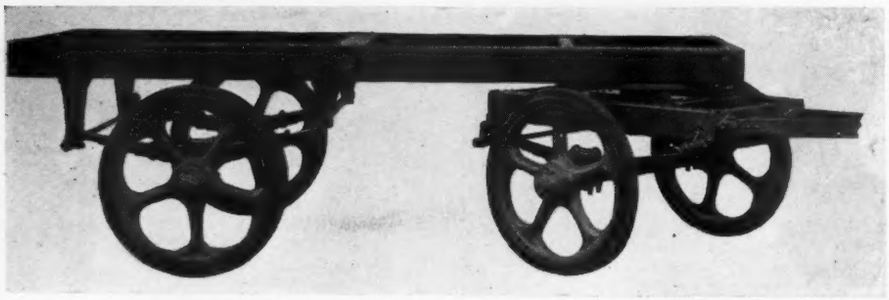
Dividing the windshield into two sections permits just the desired opening

Side View, Showing the Comfort of the Interior and Adjustable Windshield

by simply raising or lowering the vision part, while the other remains closed. This construction can be appreciated on sleety and rainy days, as it gives the driver a clean view of what is ahead, making for safe driving. The cab is roomy enough to seat three passengers without crowding and plenty of leg space. The cushions and lazy back are deeply upholstered.

Heavy Duty Trailers Adaptable for All Lines of Work

THE Automotive Trailer Corporation, general offices 1442 McCormick Building, factory, Kincaid, Ill., are offering to the trade a complete line of heavy duty trailers. The various types, semi, 4-wheel, pole and 2-wheel trailers are manufactured in capacities of from one to fifteen tons; also special models, railroad, 20-ton 4-wheel, for extra heavy duty and reversible trailers. It is the company's object to furnish a trailer for every demand.



Two-Ton Model. Note Sturdy Construction Throughout

The design and construction of a product is a question of prime importance, and one which demands thorough investigation. In designing Automotive Trailers expert engineering skill was called to bear, resulting in a product that is adaptable to service under the most trying conditions. Several years of experience in the manufacture of trailers and the general use of same is also embodied in the design. All features essential to the making of a trailer that will deliver uninterrupted service have been taken into consideration.

Mr. S. E. Liedabrand, vice-president and general manager of this company, is recognized as a member of the old school in the trailer business. All the work undertaken at the factory is turned out to meet all the requirements of the trade. Production is further facilitated by machinery and tool equipment of the most modern type.

Materials used are of the high quality. The rolled stock, which is used for spring rods, king pin, spring bolts, etc., is chrome nickel alloy heat treated. Axles are chrome Vanadium alloy heat treated. The frame is pressed steel, hot riveted, electric furnace steel castings.

Standardization in construction has been the policy of this company. In fact, this standardization is apparent when considering that in the twenty-five distinct models being built, only four sizes of frames are used, five sizes of axles, three sizes of castings, six sizes of springs, and one size of roller bearing turntable. The four-wheel models can be converted into two other jobs, namely, semi or pole trailer—three models in one. The time required for change-over from one model is comparatively small.

The accompanying illustration will outline the construction of the roller bearing turntable, or fifth wheel steering arrangement. This is a mechanical feature worthy of notice. It assures perfect tracking on the part of the trailer, and also eliminates the possibilities of repair bills by preventing side sway, zigzagging, swinging and other elements which are detrimental to both the motor truck and the trailer.

This design is distinctive because of the fact that chrome nickel roller bearings, which roll on oil-less bushing, are used.

Oil-less bearings are standard equipment throughout. The feature outlined in this respect is that practically all damaging results originating from lack of or insufficient lubrication are done away with. Little or no attention is required on the part of the man operating the trailer from this standpoint. These bushings are used on all moving parts, such as king pin, turntable rollers, spring bolts, etc.

Steel wheels have also been adopted as standard equipment in trailer construction. On heavy duty work the steel wheel is indispensable. Wheel repair bills are done away with.

The hub is cast integral with the wheel, thus assuring perfect alignment and making for longer tire life.

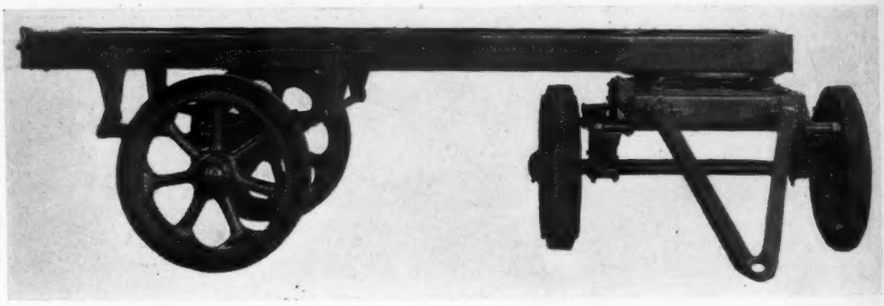
Specifications of Four-Wheel Models

Tires—Firestone, solid rubber, pressed on.

Wheels—Dayton steel wheels, hubs cast integral, assuring perfect alignment.

Bearings—Bock or Bower roller bearings on axle spindle. Bound-Brook oil-less bushings used on king pin, fifth wheel roller, spring bolts, etc.

Axle—Chrome vanadium alloy steel, round, hammered forging, heat-treated, dead axle type, taper spindles.



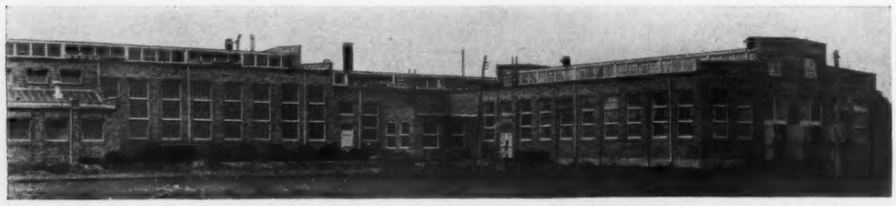
Five-Ton Model, Showing Fifth Wheel Steering Arrangement

Springs—Tuthill springs, semi-elliptic. Chrome manganese steel, one end shackled, alloy steel heat treated spring bolt, oil-less bushing, both ends bushed, spring deflection under load, 3 in.

Frame—Pressed steel, hot riveted, reinforced cross member dimensions variable to models—5-ton model, length, 168 in.; width, 36 in.; depth, 8 in.; flange, 3 in.

Tongue Coupling—Angle iron V construction, bracketed to sub-frame, hot riveted, electric furnace castings, load taken through spring rods, sub-frame, transmitted to main frame.

Tow Hook—Standard Government "Class B" tow hook.

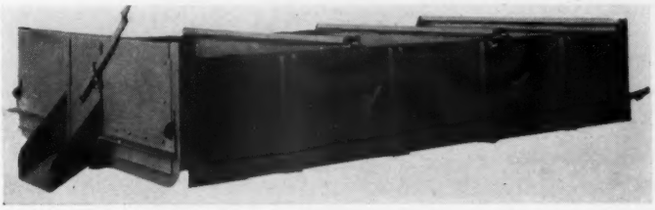


Exterior View of Factory in Kincaid, Illinois

Mansfield Combination Compartment Dump and Stake Body

The Mansfield Steel Corp., Detroit, Mich., has recently brought out a new combination compartment, dump and stake body, for general utility work, particularly work of a contractor nature.

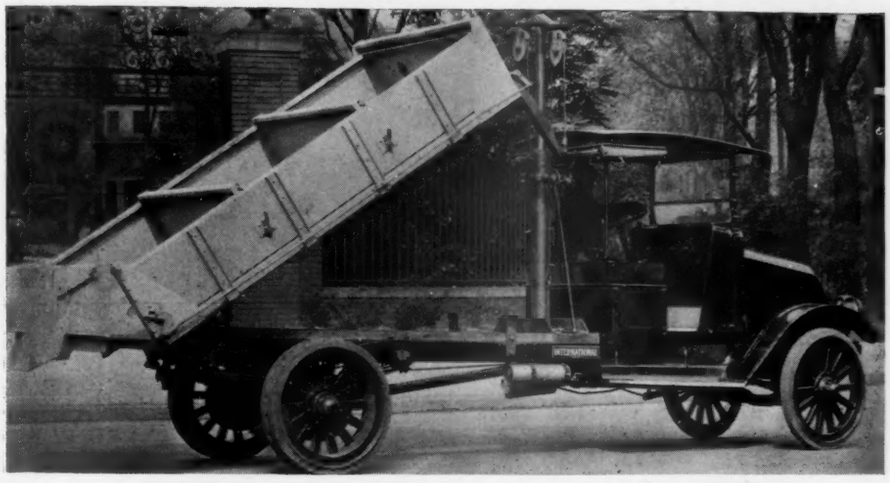
This body is made in all sizes, ranging from 2 to 10 yd. capacity and made in lengths of 9, 10, 10½, 11 and 12 ft. long. The body can be divided into three sections if desired by securing three detachable partitions, equi-distant from each other, to the sides. They are held in their respective places by a hinge suspension arrangement on the upper edge of the side panels and locked to the side panels by a special lock, which is operated from the outside. This design permits the dumping of one compartment without the disturbance of material in the other two compartments. The tail-board, which is secured firmly to the end of the side panel by another locking device and which can be manipulated by the driver while at the seat, also has a coal chute, the opening and closing of which is done by lifting or lowering a shutter by means of a lever and fulcrum device.



This Convertible Body Has a Double-Acting Tail-Gate.

The bodies are also made with double acting tail-gates. This type of tail-gate has proved a great success to contractors for hauling material other than dirt.

By removing the side panel, this body is converted into a form used for the hauling of materials such as lumber, brick, tile, cement, etc.



Mansfield Body Held in a Position of Discharge by a Hydraulic Hoist. It is Mounted on an International Truck

The express body is made by adding to the platform solid side and flare-boards which are held upright by stays set in keepers fastened along the edges of the platform. The side and tail boards are held to the platform by hooks, attached to the edges of the platform which engage with eyes fastened on the lower part of the side and tail-boards.

When a farm body is desired such as used for hauling live stock, extension sides are added. The side extensions are slatted and secured to the upper ends of standards which pass down through holes in the flare-boards and set in keepers on the sides of the platform. A body section similar in construction to that of the sides and which is held to the platform in a like manner, is set immediately behind the cab. The ends of the extension sides register with this portion of the body section, being held together by a hook and eye arrangement fastened on the upper slats. The tail-panel is identical in construction and is secured in the same manner.

Wheel Companies Merge

JACKSON, MICH., Oct. 22.—It has been announced that a merger is forming which will unite leading automobile wheel industries in the United States. It will involve a capitalization of $20,000,000 and will include the Hayes Wheel Co., Jackson; the Hayes Motor Truck Wheel Co., St. Johns; the Prudden Wheel Co., Lansing; the Gier Pressed Steel Co., Lansing; Imperial Wheel Co., Flint; Pioneer Pole & Shaft Co., Piqua, O., and Weiss & Loesch Co., Piqua, O. The new organization will have its headquarters at Jackson.

Spicer Forms Merger

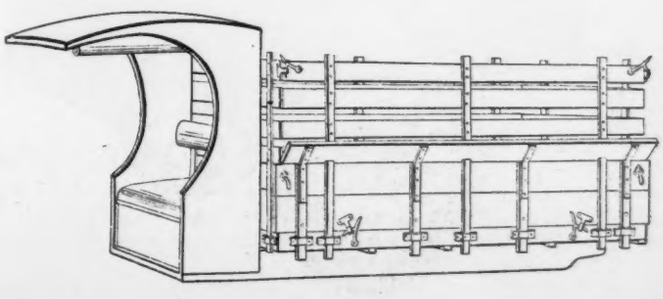
SOUTH PLAINFIELD, N. J., Oct. 29.—The Spicer Mfg. Co., manufacturers of automobile universal joints and propeller shafts, have purchased the Parish Mfg. Co., Reading, Pa., and the Sheldon Axle & Spring Co., Wilkes-Barre, Pa. These plants will continue under the same competent managers who now have them in charge and the same general sales and manufacturing policies will be enforced. Stock ownership will reside in the Spicer Mfg. Corp.

In addition the company has purchased a 16-acre plant at Pottstown.

Ritcheson Convertible Truck Body

Quantity production on a new convertible body which combines three different forms in one general assembly has been started by A. A. Ritcheson & Co., Dallas, Tex. The makers state that changes can be made rapidly and the three body styles cover the requirements of farm service.

The first or fundamental form of this truck body is the plain body floor which may be used for platform purposes, such as hauling lumber, cement, etc. From this type the body may be converted into an express body by the addition of side-boards. By attaching panels above the side-boards a typical farm truck body

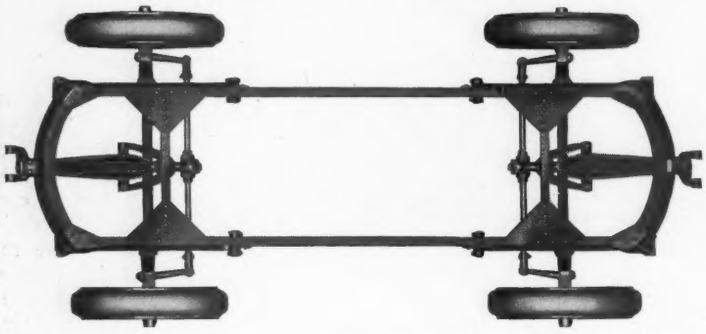


View of the Ritcheson Body Which Combines Three Different Forms in One Assembly.

Byron Four-Wheel Trailer

To start production solely on motor truck trailers of various designs and capacities has been the entire aim of the Byron Engineering Works, Louisville, Ky., ever since it has been established. This company's line of trailers includes four-wheel reversibles, semi-trailers and pole trailers of from three to seven tons capacities. The four-wheel Byron trailer, which was designed and patented by O. E. Byron, has several unique and distinct features, one of which is the steering device, arranged in such a manner on the four-wheel trailer that the trailer will automatically track the front wheels of the truck or tractor that is pulling it. Furthermore, the steering arrangement is distinctly separate from the drawbar; this enables the operator to steer from either end of the trailer, independent of the position of the drawbar. This is an unusual advantage, as it eliminates the necessity of detaching the trailer from the truck in reversing.

The fact that the spring connection between the steering arm and the axle rod acts as a shock absorber and which also relieves the steering parts of undue strain, is the feature that permits the trailer to be pulled over uneven surfaces, without changing the alignment of the wheels or causing the trailer to swerve from side to side.



Airplane View of the Byron Trailer. This Trailer Can be Steered From Either End.

The drawhead of the four-wheel trailer is made of high carbon steel, drop-forging, connected by pins permanently fixed. The drawbar is locked in place and cannot become disconnected until its front end is lowered close to the ground. A pintle hook is furnished with each of the Byron trailers, another feature of safety, as this is said to prevent the trailer from running loose in case the hook broke. The draw head connection is made very short, so that the trailer can be located close to the platform for loading or unloading from the end.

Another feature of the Byron trailer is that a trunnion is on the draw head for attaching the draw bar of another trailer, eliminating the need of a special connecting link.

Steel Trailer

A trailer that can be quickly and easily attached and detached and also comes complete with the necessary connecting links for attaching to a passenger car, has been designed by the F. P. Lyons Iron Works, of Manchester, N. H. It is equipped with pneumatic tires and a steel body. It can be had with various appliances for carrying certain types of articles, such as milk cans and crates.

The specifications briefly are: Steel body, frame and let-down back, 72 in. long, 46 in. wide and 12 in. deep. The wheels are wooden, automobile type, 30 x 3 in., with ball bearings and 1¼ in. axle. The wheels are equipped with 30 x 3-in. non-skid pneumatic tires. The trailer body has a wood flooring with steel protecting strips. Its capacity is 750 lb. and is finished with a dark green body, wheels and trimming being finished in black. Regular type of automobile springs are used and the trailer can be obtained with or without mud guards.

Two-Wheel Trailer Equipped With Automobile Type Springs and Wheels

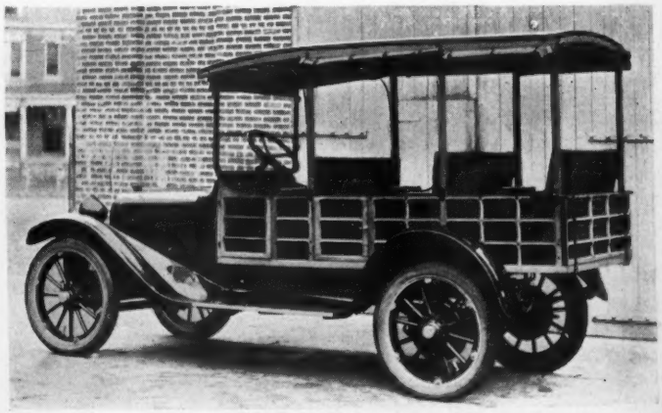
The Columbia Model G Takes Trip

PONTIAC, MICH., Oct. 19.—O. L. Wright, district sales manager of the Columbia Motor Truck & Trailer Co., has just completed an interesting trip with the model G, 2½-ton Columbia truck. The truck was equipped with solid tires, a farmer's special body, and an all-weather cab. It was driven from Pontiac to Baltimore, Md., making the trip of 595 miles in 41 hours' running time. The purpose of the trip was to test the Hinkley motor and it proved that good mileage can be obtained through heated gas by means of a ram's horn hot spot manifold.

Body for Dodge Car Chassis

The Martin-Parry Corp., York, Pa., builders of automobile commercial bodies, have started production on a new addition to their already extensive line. It is known as the Park Auto Body for the Dodge chassis. This body is featured by simplicity, neatness and strength. This body is peculiarly adaptable to hotel, school and station use, as it can be used to carry passengers or, by the removal of the rear seats, it can be converted into a conveyance for the hauling of baggage.

Eight or nine people can be carried with comfort and ease. As there are doors on both sides of the body the seats are very accessible. The center seat also folds up, affording admittance of passengers to the rear seat. The seats are large and roomy and have deep spring cushions, thickly upholstered and covered with artificial leather in harmony with the light chestnut and dark brown finish of the woodwork. Side curtains are also included. The floor is covered with linoleum, which not only gives it a neat appearance but facilitates cleaning.



Martin-Parry Body for Dodge Car is Used for a Passenger and Delivery Conveyance.

TRUCK EQUIPMENT AND APPLIANCES

Perfection Heater for Trucks

A device to protect goods of a delicate nature from cold weather when making deliveries with trucks is being offered to the trade by the Perfection Heater & Mfg. Co., Cleveland, Ohio.

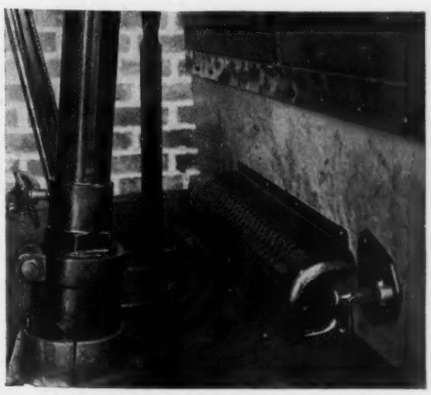
As the heat, which is obtained from the exhaust, is furnished only through radiation of air, the atmosphere of the interior of the body is not polluted with gas fumes. In other words, the heat is introduced into the interior of the body by direct radiation exactly like buildings are heated by steam.

This concern manufactures many different types. The underlying principle of the new model for trucks, however, is similar. The variations being with reference to size or design or the provision made to meet special conditions pertaining to installation.

The construction and attachment is simple. The heater consists of a valve attached to the exhaust pipe between the engine and the muffler. This valve is operated by a lever on the radiator of the heater. When the valve is open a part of the hot exhaust gas is deflected through flexible tubing to the heater-radiator. Upon reaching the radiator, the gases are distributed to a number of horizontal gas-pipe tubes through which they pass to the outlet pipe underneath the car. The radiator-tube material is said to have a high heat-radiating efficiency. As shown in the illustration, the heat is spread through the interior of the truck body by radiation and has no contact with the gases of the exhaust.

It is also said that because the valve connection is made in front of the muffler, the work of the muffler is facilitated by a part of the exhaust gases being deflected and run off through an additional channel and instead of causing back pressure, a greater amount of mileage per gallon of gas is possible with the heater valve wide open. As the heat control is provided with graduations, the heat can be regulated or completely shut off as desired.

Perfection Heaters are manufactured in nine different types and the prices, which include complete equipment, range from $25 to $45.



Note Convenient Position of the Perfection Heater Against the Dash

Single Tire Grip for Trucks

The Holmes Mfg. Co., Shelton, Conn., has recently offered to the trade a new non-skid gripping device for single tires. As may be seen from the illustration herewith, the hook and chain arrangement enables quick attachment or removal of the device, without any additional adjustments. It is claimed not to distort or tear the tires, nor cause undue vibration.

The controlling idea in the construction of this device was simplicity, which simplicity may be evidenced in the resulting product. It consists of a single steel, drop-forged gripper, that extends around the circumference of the tire, on the ends of which hooked caps are screwed, to provide a means of hooking the chain, that passes around the felloe of the wheel, holding the gripper in place. A substantial rubber buffer, which slips over the chain, keeps it from wearing the wood spokes.

Holmes' Non-Skid Gripping Device

For ordinary service a set of four grips on each rear wheel is sufficient. The sizes range from a 3 in. to a 14½-in. tread, with relative prices of from $10 to $20 for a set of four.

Portage Rubber Co., Akron, O., has been ordered by its directors to declare the regular quarterly 3 per cent. dividend on its common stock, to be paid on November 15, on all stock of record on November 5.

Pneumatic Truck Wheels

The Luverne Automobile Co., of Luverne, Minn., has placed on the market a complete line of pneumatic-tired truck-wheels. This wheel is designed to avoid the delay and trouble of having solid tire equipped trucks changed over to pneumatics.

Luverne Wheel to Replace Solid Tires

These wheels are furnished in various sizes to fit the different makes of motor trucks and are equipped with Firestone demountable rims and any make of tire desired in sizes ranging from 32 x 4½ in. to 40 x 8 in.

They are wood artillery wheels of the standard type. They are hubless but the bore dimensions vary so that it will fit any hub. The old truck tire equipment can be changed to pneumatics in a few hours. This plan eliminates all necessity for laying up the truck, reduces the cost of making the change, makes a better job, and leaves the old wheels intact for further use, should they be needed.

Genco Freezometers

The Genco No. 111 Freezometer, manufactured by the General Scientific Equipment Co., of 2718 West Lehigh Ave., Philadelphia, Pa., is a device to test the condition of the solution of the water cooling system when denatured alcohol is used. This little device will ascertain the exact temperature conditions of the solution. A small quantity of the solution in the radiator is drawn into a covered jar and the Genco Freezometer floated in it. The exact temperature at which the solution will freeze will be shown on the scale.

Wieland Tire Tool

The tire repair shop requiring a tool that will quickly and effectively reverse and retain tires in their position, will find the Wieland spreading tool a practical, light and strong tool for opening up the casing when repairs are necessary within, or for cleaning purposes. It is made in large and small sizes by the

Showing How the Wieland Tire Tool is Used

manufacturer, Charles Wieland, of Yankton, S. D. For ordinary work on any shoe three or four tools will accomplish satisfactory results. The large size retails at $1.50 each, and the small size $1.25 each. A set of four, of either size, or sub-divided into two large and two small each, can be purchased at $4.25, $4.50 and $5.00 respectively.

Emergency Anti-Skid Chains and Appliances

Dow & Cole, of 1173 Elm St., Manchester, N. H., manufacture Emergency Anti-Skid Chains, the Patent Lock Hook and the Spider Skid Chain Adjuster. The Emergency Skid Chains are strong and well made and designed to have the least possible wear on the tire tread. They retail at from $8 to $8.75 per set of 12.

The Emergency Anti-Skid Chains Attached to Wheel

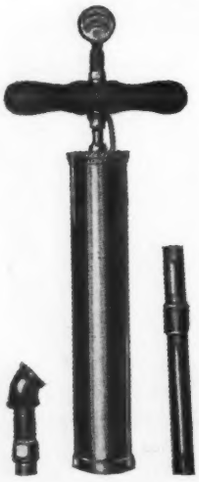
Close-up View of the Lock Hook
Note the cape that can be screwed up against the hook

The Spider Anti-Skid Chain Adjuster is a device to retain the Anti-Skid Chain securely, preventing them from striking the mud guard, thereby reducing all chain noise. The price per set is $5.

The Patent Lock Hook, for use with Anti-Skid Chains and the Spider Anti-Skid Adjuster is a device that prevents the loss of skid chains and facilitates putting them on and taking them off. The accompanying illustration clearly shows the construction. The cape extends over toward the hook of the device and can be screwed up close to prevent the link from getting off the hook or unscrewed when it is desired to remove the anti-skid chain. These can be obtained in two types, single and double. The single type retails at $1.25 and the double type at $1.80 per doz.

Motor Tester

A useful device about the repair shop for determining the condition of engine bearings and the compression in the cylinder is being manufactured by the



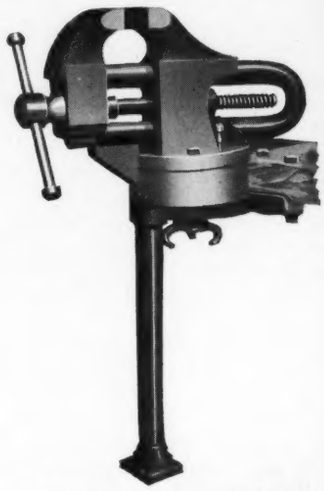
The Hempy-Cooper Motor Tester
Locates loose bearings and indicates condition of compression.

Hempy-Cooper Mfg. Co., Firestone Bldg., Kansas City, Mo. With this device loose bearings, such as wrist pin, main or connecting rod are easily located. It also tests leaky valves and cylinder compression. Each cylinder is tested separately, which enables the determining of any defective cylinder.

It is a time and money saver in that it determines whether there is a necessity for tearing down the engine for repairs. The loose bearings can be easily felt and heard. By forcing compressed air in the cylinder and immediately withdrawing the same, a semi vacuum is caused that causes loose piston pins to give forth a sound which indicates a looseness that is the cause of poor compression. The loose bearings can be easily felt and heard.

Swivel Steel Yoke Vise

The Ware Twin Engine Truck Co., 201 Harvard St., S. E., Minneapolis, Minn., is offering to the trade the Ware Swivel Steel Yoke Vise, in three sizes. The body is made of semi-steel, and the jaws are faced with tool steel, cut diamond shape. The remaining parts are made of cold-rolled steel shafting. Ball



The Ware Swivel Steel Yoke Vise

bearing nuts hold the vise at any angle. The pipe leg support gives unusual rigidity against the downward stroke of the hammer. This vise is made with 4, 5 and 6-in. jaws, the vises weighing respectively 70, 110 and 175 lb.

Dayton Supplies Steel Wheels for Pneumatics

The Dayton Steel Foundry Co., Dayton, Ohio, is continuing its volume production of steel wheels for pneumatics. With some slight modifications, the Dayton steel wheel for pneumatics is practically the same as that for solids. It is, of course, much lighter, but the same general design is similar to that of the Dayton wheel for solids.

Dayton Wheel for Pneumatics

This wheel is made of electric furnace steel, with the hub cast integral. The spokes and rim are hollow and of uniform thickness—features that make for a light wheel. The scientific construction, which takes in the odd number of spokes and their sweeping contour, the maker states, are for the purpose of dissipating road shocks. There is also a fine arching of the spokes that eliminates all danger of wheel fracture. The ponderous pneumatics can be slipped on and off the Dayton wheel with ease. A special slot is provided in the rim for the air tube.

The wheels are particularly commended because of their ability to radiate heat quickly, and its retentivity of true roundness. The Dayton wheels are being made for all types and makes of trucks.

Sunnyhome Light and Power Plant

A new electric light and power plant is being made by the Sunnyhome Electric Co., Detroit, a division of the General Motors Corp. It is known as the Sunnyhome Plant. The outfit is very

The Sunnyhome Power and Lighting Plant
This illustration gives a graphic idea of the value of a cover

complete and includes a power house to cover and protect it from the weather. The only attention necessary is that oil is supplied about once a year and that the gasoline tank is kept filled from time to time. This outfit can be adjusted to start and stop automatically at any time and when the gasoline has been almost consumed a red lamp, which can be located within the house where it will be readily noticed, illuminates, indicating the need of replenishing the fuel.

This plant will also run such devices as electric irons, heaters, refrigerators, etc., continuously.

The specifications are as follows: Engine 2½ hp., one-cylinder, four-cycle, with heavy flywheel; cooling, water circulated by gear pump through engine jacket to radiator assisted by a Sirocco fan; lubrication, force feed to all bearings. The supply of oil stored in the engine base is sufficient for one year's operation; speed, constant at 2000 r.p.m.; generator, two-pole, direct current, 1250 watts with "booster" to keep the lights steady; voltage, 110 volts, capable of operating standard lamps and accessories; battery, 52 cells in rubber jars, especially built for Sunnyhome; control, fully automatic; foundation, none necessary, the reinforced steel gasoline tank supports the entire plant; the plant is housed complete in a steel shed insulated against cold weather.

Improved Windshield Cleaner for Trucks

The Outlook Co., Cleveland, Ohio, is offering to truck users and manufacturers a strongly constructed windshield cleaner that will withstand the jolting of solid tires and loaded trucks. The cleaner is said to operate from the driver's seat without undue care or adjustment.

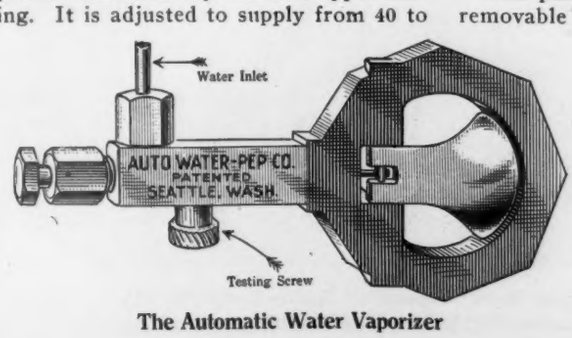
The method of connecting the handle rod with the rod carrying the wiper is claimed to do away with looseness or play between parts of the cleaner. The wiper rod runs through a small knob at the top of the handle rod. The lower part of the knob is threaded and a sleeve which runs through the knob screws up tight against the wiper rod. It is practically self-locking and yet can be loosened at any time.

Spring steel is used in order to provide the necessary tension required to hold the rubber squeegee close to the glass while the adjustable rubber roller on the handle rod keeps the tension even at every point. The rubber roller also prevents swaying and rattling and holds the cleaner up and out of the way when not in use.

The Outlook Cleaner sells for $2.00 ready to attach.

Automatic Water Vaporizer

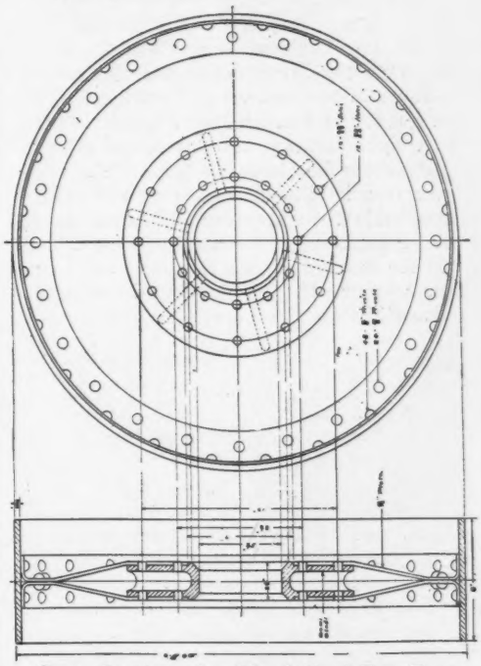
A new vaporizer has been placed on the market by the Auto Water-Pep Co., Second Ave. and Blanchard St., Seattle, Wash. This device draws moisture from the water system or from a special tank, supplied at extra cost. The device itself is inserted between the carburetor and manifold connections. The water jacket or circulating system can be tapped at the most convenient point and the vaporizer connected by flexible copper tubing. It is adjusted to supply from 40 to 60 drops of water per minute. This device automatically shuts off when the engine is stopped.



The Automatic Water Vaporizer

Industructible Pressed Steel Wheels

The Indestructible pressed steel double disc type wheel manufactured by the Indestructible Wheel Co., Lebanon, Ind., is built on the triangle principle so that the shape cannot be changed without distorting one of its sides. This method of construction allows a gain in strength accompanied by the elimination of a considerable amount of material which has no strength value.



Cross Section of a 36 x 4 Dual Two-Ton Double Disc Pressed Steel Rear Wheel

This wheel consists of two discs which have long flanges on the outside circumference whereby the rim is supported, and the inner section of the discs are bolted to a semi-steel hub casting. This manner of disc assembly is said to form a triangular base which will counteract the road shock and vibration by cushioning and absorbing. The large disk area of this wheel enables it to absorb still more and dissipate the shocks that would ordinarily be transmitted to the hub barrel.

Wonder Folding Pump

This pump has a collapsible base and removable handle. It is manufactured

Collapsible Pump
Note sections that can be folded

by the Sidel-Rattner Mfg. Co., Inc., 31 Broadway, Brooklyn, N. Y. It consists of a single easy operating cylinder, supported on a malleable folding base. The handle is hardwood. A good check valve and an air-tight piston assembly is said to prevent any leakage. The plunger rod is cold-rolled steel and the cylinder is heavy gage steel, japanned and with brass fittings. The dimensions of the pump folded are 21 x 2¼ x 2 in. The price is $3.

Gray & Davis Improved Lighting System

Many improvements are to be noticed in the latest Gray & Davis Lighting System. The basic principles are the same as in past years and the changes are in a form of mechanical refinements. The generator and motor have been reduced in weight and size and the round type of instrument has been adopted. The construction is simpler and more noticeably accessible than heretofore. Adjustments or replacements of brushes is facilitated by the moving of one circular band from the instrument. The cut-out is mounted accessibly on the generator and cap or on top, according to the design. The armature of either generator or motor is easily removed, giving access to all of the parts.

The Type 500 starting motor is approximately 4 in. in diam. It is designed for engines of the average horsepower. The Type 700 starting motor is 5 in. in diam. and designed for larger engines. The Type 500 is for use on engines up to 300 cu. in. displacement.

The generator is a third-brush four-pole, shunt wound instrument. Type 600 is 4 in. in diam. and very light. It is designed to run at 1-and-½ engine speed. Type 800 is 5 in. in diam. and is designed to operate at engine speed. Various types of generators are in the new Gray & Davis line, each having the same distinctive characteristics and fundamental principles.

Ignition System

The new Gray & Davis Ignition System is designed to supply an intensely hot spark at all speeds. The battery, coil and distributor are the 3 units of this system, the latter having a vertical mounting, and made a part of the generator as shown in the accompanying illustration. This provides a neat distribution of the wires to the plugs and minimizes the tendency to short circuit. The distributor plate can be readily placed in position without disturbing the brushes and therefore necessitating the use of tools. The body is a highly-insulating heat-resistant composition. The interrupter is an integral part of the distributor and is readily accessible for examination and cleaning of points.

The magneto replacement system consists of an ignition coil and a distributor. It will replace any standard magneto on a battery equipped car. The distributor and coil are mounted on the same base in a vertical position and the drive shaft is for standard horizontal magneto drive.

The Gray & Davis systems are six volts, and are manufactured by Gray & Davis, of Boston, Mass.

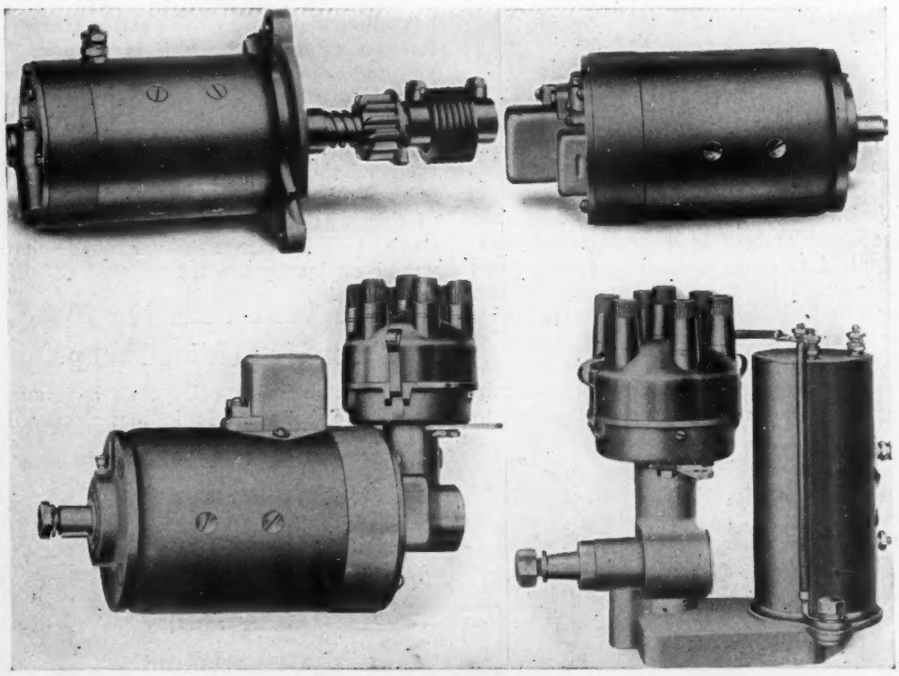
Owen Cord Tires

The Owen Tire & Rubber Co., of Cleveland, O., manufactures two types of pneumatic cord tires, the Owen Cord Non-Skid and the Owen Cord Ribbed Tread. The latter is designed exclusively for the front wheels which is said to make for more effective steering. The non-skid is recommended for use on the rear wheels. The side walls of these tires are extra thick, reinforcing and bracing the tread with their strength. Between each ply an exceptionally heavy skim-coat of rubber, claimed to give the tire frictionless strength and durability, is inserted. Another feature of the Owen tires is the cross wire cable used in the beads.

Owen Cord Tires
Right: Owen cord non-skid tire. Left: Owen cord ribbed tire

Owen fabric tires are also well built. The heavy side wall construction is similar in this product. The cotton entered in its manufacture is long and strong fibre, and the rubber is compounded to give resiliency, strength and satisfactory mileage.

Owen tubes are manufactured in both red and gray. They are constructed by hand, the same care being taken as in the production of Owen tires. High grade Para rubber, scientifically compounded, is used in their make-up. The laminated process, which involves the building up of one layer of thin rubber upon the other and then vulcanizing the whole, is pursued. The valve patches are vulcanized into the tube.



Upper Left: Starting Motor. Upper Right: Generator. Lower Left: The 614 Generator With Vertical Ignition. Lower Right: The Magneto Replacement System

New Hudson Repair Arm

The Hudson Motor Specialty Co., 1932-34 Arch St., Philadelphia, is starting quantity production on a new crankcase repair arm. It will be known as model "B." This new model is designed to take care of a slight change in the new Ford cars that have been coming through since August 1, 1919. The new repair arm is practically identical with that of the old model "A," differing only in that the construction of the arm varies from that of the regular model.

Production on both model "A" and model "B" will be continued in order to take care of the repair demands of the older models of Ford cars and the new models. The list price is the same as the regular model, being $1.50, including the regular discount.

New Midwest Engine is a Distinctive Heavy-Duty Job

IT has been the aim of the Midwest Engine Co., Indianapolis, Ind., to create a heavy-duty engine that would be distinctly different from the lighter-duty prototypes, namely, the passenger car and the semi-heavy duty truck engine. Working toward this objective the company finally developed a heavy-duty internal-combustion engine, designed particularly for heavy-duty work and heavy-duty work alone.

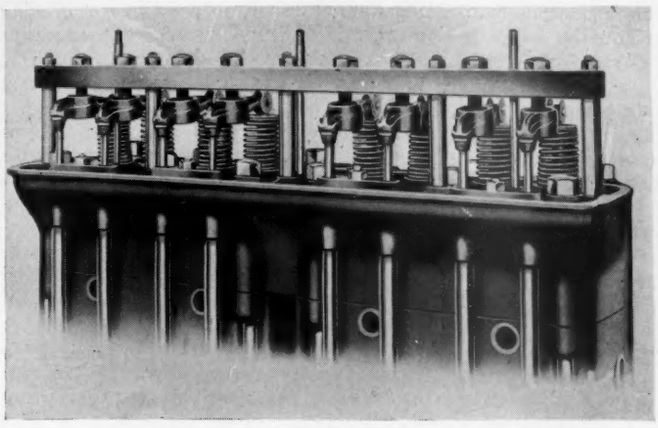
In designing this new engine the manufacturer has considered the following four points, points of fundamental importance for the development of a satisfactory product of this nature. The margins of safety in every part are exaggerated in strength and dimensions so that the possibility of breakage under the hardest service conditions is minimized. All working parts should be floated in lubricant, without fouling the spark plugs or wasting the lubricant. Grit and dust must be kept out of the bearings and other vital parts. Super-positive cooling should be provided.

The same general design extends to the other four productions of this company, namely, the 4½ x 6 in.; 4 x 6 in.; 4 x 5 in., and 4½ x 5 in. engines.

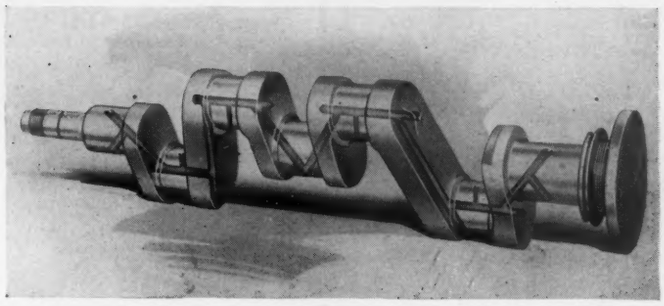
With the profuse use of size and principles of rigidity, the Midwest engineers have strived to provide strength, beyond any strain that will ever be imposed in practical usage, durability and long life. In the 4½ x 6 in. engine the crankshaft, which is 3 in. in diam., is an evident example of the heavy construction qualities pursued. The crank-pin bearings are also 3 in. in diam. The liberal dimensions are claimed to eliminate the possibility of whipping or disalignment of the crankshaft.

A full force-feed lubricant under pressure circulates the oil through a hollow crankshaft by means of a geared self-priming pump. An automatic vacuum controlled relief valve, which is located at the front bearing, adapts the oil pressure to the load of the engine instead of to the speed of the engine. As a result of this control over lubrication, with its resultant carbon deposits and fouling of spark plugs is prevented. It is mentioned that due to the points at which the leads are provided oil is injected into the bearings at the moment of minimum bearing pressure, assuring a film of oil between moving parts where friction and wear are vital.

In the new Midwest design dust and grit cannot enter the working mechanism through the crankcase, since the usual breather pipe has been eliminated. The eight tubes surrounding the push rods act as a breather, thus balancing pressure in the crankcase and valve cover, and providing a means of lubricating the valve mechanism.

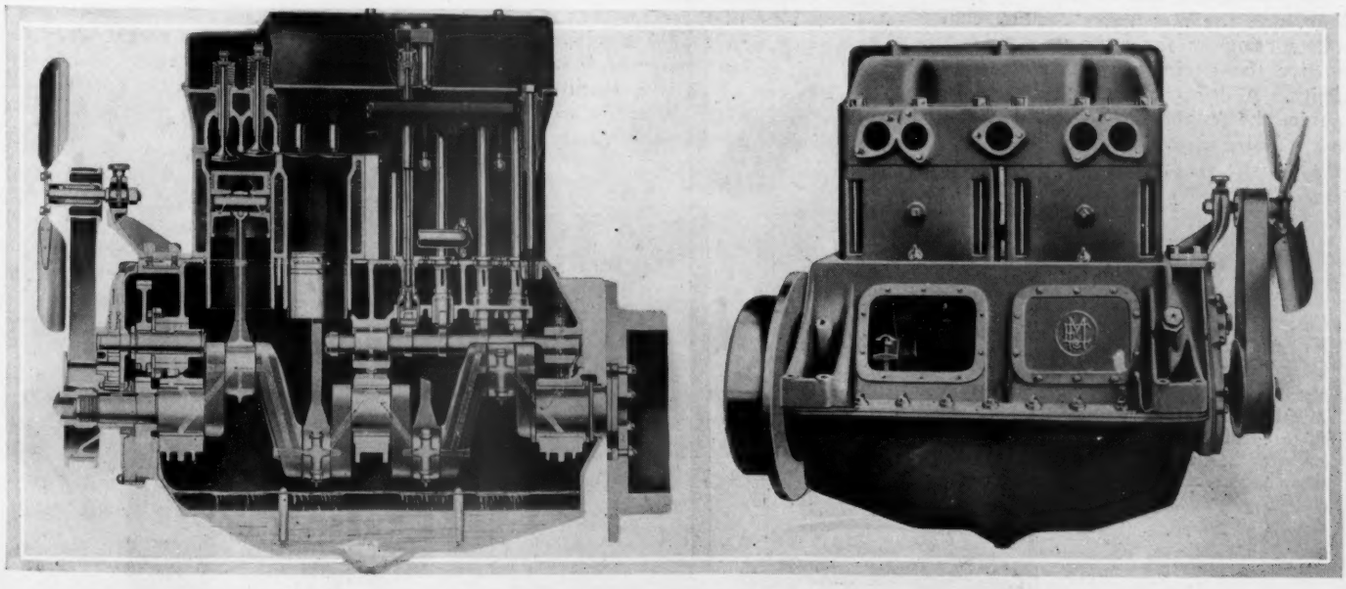


Exposed View of the Mechanism. The Valve Stems Act as Breathers to the Crankcase.



Oil Hole Drilled in the Crankcase.

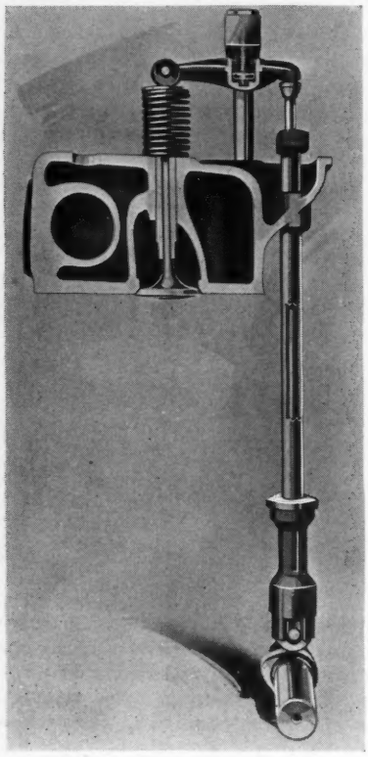
Although the cooling system which is used is conventional, it is very liberal in size and capacity, and is claimed to assure uniform cooling even under the most strenuous condition. The water is circulated by a propulsion type rotary pump with a bronze runner cast onto the shaft to prevent it from loosening. The water pipes of rigid construction, are connected to the pump and the radi-



A Cutaway and General Side-View of the New Heavy-Duty Midwest Engine

ator with flexible hose of proper length to eliminate possible strain. The water spaces, especially around the exhaust valve, are unusually large. There are three water outlets in each cylinder, directly over the exhaust valve.

The connecting rod bearings are cast in the rod. This is accomplished by centrifugally throwing the hot metal into the forging itself, thus insuring against porous spots and producing a bearing in which neither shims nor grooves are used. The connecting rod forging supports the bearing itself full length, which is claimed to prevent bell-mouthing of the bearing and loss of lubricant.



Cross Section Showing Ample Water Spacing

The overhead valves are 2¼ in. in diam. and the non-wear "rocking-chair" construction on the rocker arms is said to give the engine great wear resisting ability. A dry gas manifold is used to enable the engine to properly handle heavy fuel.

The Kennedy Internal Gear Drive Axle

THE increasing tendency toward the use of the internal gear drive principle for motor truck axles is shown by the addition of another axle of this type, known as the Kennedy Internal Gear Drive Axle, just brought out by the Hero Manufacturing Company, of 23rd and Westmoreland Streets, Philadelphia. The Hero Company was established in Philadelphia more than fifty years ago and has long been engaged in the manufacture of metal goods. The axle is named after two brothers who are officials of the concern, Hutton Kennedy, as president, and A. M. Kennedy, as vice-president and secretary.

While the war was in progress, they began plans for placing on the market a rear axle for motor trucks, and for many months, with their engineer, Joseph A. Anglada, a well known consulting engineer, made an exhaustive study of existing axles of all types, giving especial attention to rear axle problems and their general relation to the economical and efficient operation of the truck.

The Kennedy Internal Gear Drive Axle employs a number of vital, but not radical, modifications of internal gear construction that the manufacturers claim accomplish exceptional efficiency. One of the outstanding features is the adoption of a rigid policy of "quality first" in design, workmanship and material—scientifically heat-treated alloys being used in all parts.

They have, however, generally speaking, followed accepted practice in fundamentals, rather than having branched out with untried experiments. The changes they have made, they feel, will be readily recognized as improvements in that they perform certain sought for but hitherto unaccomplished functions.

To accomplish this end, certain new features have been introduced into the design. One of these features is a form of construction that keeps the internal gear and pinion immersed in a bath of oil, a feature which is exceptionally well worked out in the Kennedy axle. This construction permits the oil to circulate freely through the housing from the hub bearings of one wheel to the hub bearings of the other.

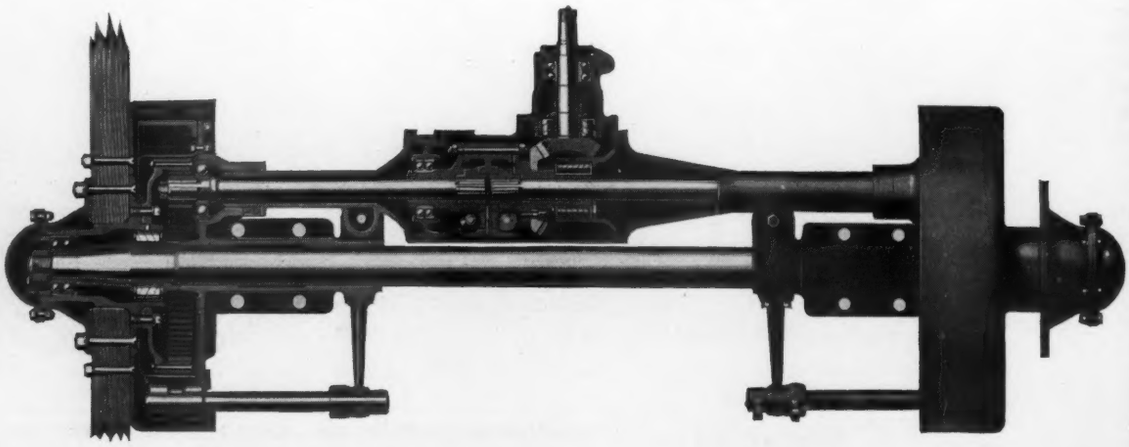
Another distinctive and exclusive feature of the Kennedy Internal Gear Drive Axle is the provision for torque shock absorption. This is accomplished by the use of four coiled springs connected with the jack shaft housing in such a manner as to permit of a slight rotation of the housing, thus causing the absorption by these coiled springs of the shock occasioned by changes of torque due to the application of propelling or braking power. The reduction of excessive strain on the propelling mechanism, bearings, shafts and wheels, resulting from this construction is very marked.

This unique method of torque absorption, which is applied directly to the axle itself, shows its worth promptly in reduced cost of truck up-keep, including increased tire mileage. Although Kennedy axles are furnished regularly without radius rods, they can be attached if desired.

Especial attention has been paid in the design to securing extra large braking surfaces and the use of internal expanding brakes has been made possible by the elimination of oil leakage from other parts. Option is given of one or two sets of double expanding cam operated shoes. A propeller shaft brake can also be furnished, if desired.

The use, as standard equipment, of the well known "Powrlok" self-locking differential provides even traction to each wheel at all times. This equipment makes it practical to use pneumatic tires where speed is wanted and prevents stalling in sand, gravel, mud or snow; overcomes the danger of skidding and prolongs the life of tires, especially pneumatics.

Throughout the construction, extra large, high quality bearings are used, insuring long and efficient service and minimizing replacement costs. They use a combination of Hyatt roller and double annular ball bearings on the pinion shaft, differential and wheels, with standard mounting.



Cutaway View of Kennedy Internal Gear Drive Axle.
Note the housing construction that permits oil to circulate freely and keeps the gear and pinion immersed in oil.

Through the construction employed, the truck springs can be over-slung or under-slung. Attention has been paid also to the needs for varied frame widths by giving an exceptionally wide range of spring centers, making the Kennedy axle adaptable to almost any design of truck. It is also adaptable to steel or wood wheels and to solid or pneumatic tires.

rated for 1½-ton trucks, with a limit of load on spring pads of 4200 lb. Model 25 is rated for 2½-ton trucks, with limit of load on spring pads of 7500 lb., and model 35 is rated for 3½-ton trucks, with limit of load on spring pads of 13,000 lb. The maximum allowable hp. for each model is: ¾-ton, 22 hp.; 1½-ton, 25 hp.; 2½-ton, 35 hp., and 3½-ton, 50 hp.

Specifications for Kennedy Axles

	1½ ton	2½ ton	3½ ton
Limit of load on spring pads	4200 lb.	7500 lb.	13,000 lb.
Tread	56 in.	60½ in.	65 in.
Maximum allowable horsepower	25	35	50
Standard gear ratio	7 to 1	8.3 to 1	11 to 1
Optional gear ratios	5½ to 1	6.4 to 1	9 to 1
	6 to 1	10.4 to 1	10 to 1
	8 to 1	12.3 to 1	12 to 1
Standard spring center	39 in.	40 in.	42 in.
Maximum spring center	41 in.	42 in.	44 in.
Minimum spring center	37 in.	38 in.	40 in.
Standard width of springs	2½ in.	3 in.	3½ in.
Optional width of springs	2 to 3 in.	2½ to 4 in.	4 in.
Diameter spring clip	¾ in.	⅞ in.	1 in.
Standard fore and aft clip spacing		4¾ in.	
Dead axle diameter	2 3-16 in.	2⅝ in.	3¼ in.
Wheel spoke widths	2¼ in.	2 or 2½ in.	3 in.
Number of spokes per wheel	14	14	14
Bore of wheel at hub	5⅜ in.	5½ in.	7 in.
Diameter of hub flange	11 in.	12 in.	13⅜ in.
Brakes—Option of one or two sets of double expanding cam operated shoes 2 in. wide in 21-in. diameter, wheel drum with or without a propeller shaft brake with 5-in. face and 8-in. diam.	19 in. diam.	21 in.	24 in. diam.
Approximate weight, complete with hubs and brake drums	435 lb.	630 lb.	880 lb.

Hub flanges are of special construction, reinforcing wheels against side strain.

Particular attention has been paid to providing for the easy dis-assembling of all parts in the Kennedy axle, for purposes of inspection and adjustment, so as to reduce to a minimum time lost from working hours for the truck. All movable parts are readily accessible and all details have been carefully studied from the viewpoint of the truck owner, as to ease of inspection, adjustment and maintenance.

Four sizes of this axle are now being produced by the company. Model 57 is rated for ¾-ton trucks, with limit of load on spring pads of 2150 lb. Model 15 is

The weights of the Kennedy Axle for the respective models are: 270 lb. for the ¾-ton; 395 lb. for the 1½-ton; 565 lb. for the 2½-ton, and 780 lb. for the 3½-ton. The line will be completed in the near future. Larger sizes will be brought out as soon as production warrants.

The factory in which the Kennedy axle is built is of the most modern construction, and was originally erected by the government for war work. It has 40,000 sq. ft. of floor space, and is equipped with up-to-date machinery to facilitate large production. The company is backed by unusually large financial interests who are going into manufacturing axles in a big way.

The Kenosha Rear Axle and Saucer Wheels

The Kenosha Wheel Axle Co., of Kenosha, Wis., is offering to the trade an internal gear axle and Saucer wheels for motor trucks. The axle has been built with a view to reducing weight, giving good bearing mountings, making them accessible for adjustment or replacements. The Saucer Wheels are made in two types with integral hubs and also adapted to replace wood wheels on the conventional hub furnished by axle manufacturers for wood wheels.

The axle affords unusual means of lubrication and is claimed to positively prevent the admission of dirt. The housing, being of the demountable type, can be detached by simply unscrewing one bolt that retains a clamp, which holds the housing to the end plate. When assembled this not only makes an oil tight joint, but by means of the extension of the hub that carries the internal ring gear, it also provides an oil tight reservoir.

Since the trend of truck design is toward the use of pneumatic tires, and a higher truck speed, the brakes in this axle have been built accordingly. The brakes of this axle have been found to be very effective and quite capable of stopping the truck wherever the traction of two wheels will hold it. To renew brake linings, two cap screws and the retracting screw are removed from the brake anchor, in the rear of the axle. The brake contracting lever is disconnected and the lining of the brakes can be immediately renewed.

The differential housing is carried on two trunnions, extending from the case, which are clamped in two arms cast integral with the dead axle member. This provides a light rigid support for the housing and by removing the caps and disconnecting the drive shafts at the brake drums, the differential is readily removable. This makes it possible in case of necessity, to remove the differential from truck in about a half hour.

The torque of the differential housing is taken by two keys. The location of the key ways is kept standard in the axle but may be varied in the housing trunnions, so that it is possible to give the pinion shaft any angle desired by the truck manufacturer, to meet their universal joint requirements, without inclining the axle, as has been necessary in the past.

The adjustment of the ring and pinion gears is from the outside of the case, the same keeper that locks the adjustments also holding the packing glands.

The oil filling plug is located in the housing, over the pitch line of the gears, permitting the workmen to obtain an accurate meshing of the gears, necessary to quiet running and a long life.

The bearing cage, back of the internal gear pinion, is carried in a manner similar to the differential housing by an arm cast integral with the dead axle.

By means of this construction, after machining the ends of the dead axle and locating the holes for the wheel spindles, and registering from these points, a boring bar machines the four holes in one operation, maintaining an absolute alignment of the driving members, and assuring that the internal gears are in mesh on the pitch line.

The axle is of a deep I-beam section, offering great rigidity and preventing whipping action between the drive members and the load carrying member,

General View of the Kenosha Axle, Showing Powerful Strength of the Load-Carrying Member and Unusual Position of the Brakes

which objection has been offered to some designs.

The wheel spindles are of alloy steel, and are shrink pressed into the dead member, using a straight hole and spindle bearing, which are much more readily maintained in production than are tapers. This construction has been proved in practice to be entirely satisfactory, whereas there has been considerable trouble in trying to secure the spindles with a taper fit.

The axle is at present being made in two sizes, 1½ and 2-ton capacity, with reduction of approximately 6, 7, 8 to 1.

Specifications: The tread is 56½ in. and gear ratios are 5.9, 6.8 and 8.1 to 1. The spring centers are 38 and 42 in.; springs width from 2 to 3 in.; spring clip diameter optional; the brakes on the drive shaft 7-in. diameter with a 4-in. face; brake levers 6 in. high; pinion shaft end 1¼-in. S. A. E. taper; pinion shaft end, optional, square. The weight complete with the wheels is approximately 600 lb.

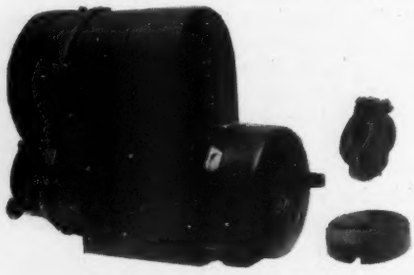
Kenosha Saucer Wheels are made in two types—those with integral hubs and those adaptable to replace wood wheels on the conventional hub made by axle manufacturers for wood wheels. The wheels are of the disk type and are cast from a special alloy developed by the company. For solid tires, the wheels are made of what is known as the "T" section, the webb being midway of the disk. The rim is supported on each side by ribs, which extend from the edge of the rim to the webb of the wheel, thus greatly reinforcing the wheel.

For use with pneumatic tires, an opening for the valve stem is provided. To do this, the maker departed from the usual construction and developed a wheel of "L" construction instead of the "T" construction, in which the webb is curved around to clear the valve stem. The wall of the webb is carried around the back of this opening and provides a slot whereby the tire may be slipped on straight without working the valve stem over the rim and through the hole. These wheels are made for demountable or detachable tires.

Eisemann Impulse Starter Coupling

Production on a new double impulse starter coupling has been commenced by the Eisemann Magneto Corp., 33rd St., Brooklyn, N. Y. This impulse starter coupling operates twice in each revolution, thus giving the impulse starter spark on all cylinders of the engine in proper sequence. It is capable of producing a spark sufficiently powerful to start those engines that have inaccessible cranks and no matter how slowly the engine is revolved a hot spark is certain to result. It operates automatically, the mechanism disconnecting when the engine starts under its own power.

An Oldham coupling in either the adjustable or non-adjustable style is furnished with the Eisemann impulse releasing operations of the mechanism twice each revolution, which produces impulse starter sparks on all cylinders of the engine in proper sequence.



New Eisemann Double Impulse Starter Coupling

It is not necessary to set this device by hand. When operating above 150 r.p.m. it is automatically drawn out of action. The operating parts of this coupling are hardened, enclosed and need no lubrication. Centrifugal force disconnects the impulse starter, but when the engine has been stopped the starter automatically sets for cranking again. This latest Eisemann starter has two pawls or mechanism to give the catching and

Giant Pneumatic Compressor

The Usaco Giant Air Compressor, the latest product of the United States Air Compressor Co., Cleveland, O., is a two stage model compressor design to capably handle the air required to inflate Giant pneumatic tires. It differs from the standard DeLuxe model of this line only in that it is of greater capacity and that it has a larger tank. The maker states this machine will inflate tires very quickly and easily without signs of overheating or laboring. Several improvements are noted in this air compressor outfit and in others of their line. An air purifier is included which removes any oil or moisture from the air and insures the admission of only the purest kind of air into the tires. A fan type of flywheel assists in cooling compressor.

New Compressor Has Increased Capacity

Duntley Air Drill

The Duntley-Dayton Co., 1416 Michigan Ave., Chicago, Ill., has increased its various lines of drills with the addition of the new Duntley Air Drill. It is made in two sizes, with a capacity of ¼ and ⅜ in. It is particularly featured by the detachable power unit and the piston construction. It is especially adapted for drilling tell-tale holes in staybolts, automobile body building and light work of that character. The weight is about 4½ lb.

The Duntley Air Drill

The power unit is a self-contained engine consisting of three cylinders and pistons mounted in a frame, the entire engine rotating about a fixed crankshaft or spindle. The cylinders oscillate from a fixed base and the cams on the fixed spindle operate the valves. This tool runs in a bath of oil and has no vibration and is economical in air consumption.

Massillon Steel Wheel

The Massillon All Cast Steel Wheels are made for all standard trucks, axles, rims and tires. These wheels are strongly built, yet are not extremely heavy in weight, and the open side slot in the felloe band, which is cast integrally with the hub and spokes, permits the use of demountable rims of all standard makes. Tires can be changed by one man with this feature. The valve stem slides into the slot without tedious steering and heavy lifting. It is manufactured by the Massillon Steel Co., Massillon, Ohio.

The Massillon Steel Wheel

Taken From Current House Organs

The High Cost of Slacking

I went visiting not long ago. I like to nose around in the big workshops. The hum of machinery sounds good to me—it seems to quicken my heart beats. When I get into one of those big rooms full of machinery where everything is just whizzing, I always feel like yelling, "Whoopee! Let her rip!" And I never could understand how a man could go crawling around at a snail's pace when everything was moving so lively.

But they will do it, by granny, and from what I saw on this recent visit of mine, I can't help feeling that us men are getting slower and slower all the time.

Years ago, when I used to drive team, I'd hop off and on my wagon as if I enjoyed the exercise, and I still try to keep it up in mounting and dismounting from my truck—although I'm a little sore in the withers and my hock-joints are stiffened up a bit.

It riles me when I see a husky chap crawl off a truck as if he thought his mother-in-law was waiting for him. And by ginger, I never expect much of the truck that is manned by one of them born-tired individuals.

I like to watch a snappy, wide-awake fellow, like my friend Jerry Jones. I saw him the other day come out of his place on a trot. He cranked his motor, and jumped into his cab in a way that made me feel like jumping, too. His bright face broke into a smile when he saw me. He waved a hand, as he shouted "Hello, Dan!" and away he went.

"Some class to that boy," said I to myself. "And just listen to his motor—some driver, I'm tellin' you."

But to get back to my visit to that big factory.

I went there, looking for a job for a young friend of mine. I saw the superintendent and got what I was after, and when he asked me if I would like to go through the plant, I jumped at the chance. He called a bright youngster to steer me around, and I was really surprised at what the pin-feathered rooster knew.

While we were watching a big machine, a chap of about thirty years old shot by. "Who's that?" I asked.

"That's Mr. Adams, assistant to the president," answered my guide.

"By gosh!" said I. "I thought I knew him. How long has he been here?"

"Oh, quite a long time," said the guide. "I've heard them say that he started as office boy. He's the main squeeze now. What he says goes in this plant."

"Well, young man," said I, "your assistant to the president used to deliver paper at my house fourteen to fifteen years ago. He was a hustling lad, and I'm not a bit surprised at his success. He moved then as he moves now—as if he was going somewhere."

But, I'm sorry to say, everyone in that big plant didn't have the Assistant to the president's snap and energy. I saw a lot of slow-movers, who, as my hustling old Daddy used to say, weren't worth hell room. Apparently they were afraid some one would think they liked their jobs. Pointing to one time-killer, I asked the guide, "was that duck always that slow?" "Oh, no," said he. "He gets fifty cents an hour now. Four years ago, when he was getting twenty-five cents an hour, he moved twice as fast."

And I'll bet he's sore at the high cost of living.—*"Driver Dan"*—Sterling Motor Truck Co.

"The Bragginest Man in Town"

"Your local committeeman sure is a live wire."

"Mebbe so, but he's the bragginest man in town—always tellin' you what he's done."

"That's not so bad as bragging about things you are going to do."

The man under discussion was the chairman of the local reception committee, in a small town in South Dakota. He was no shrinking violet—far from it—and there may have been some truth in the statement that he was the bragginest man in town, about what he'd done.

But it's a whole lot better to have accomplished something worth bragging about and then brag, than never to do anything worth while.

This man really had something worth while to his credit. He had been deeply interested in road work and during the war had been called to Washington to assist in the work of the Motor Transport Corps.

And then there was the "Sunshine Trail," a highway running from the North to the South of this great country of ours. It had been laid out to run through a rival town, 10 or 15 miles away, but through strenuous efforts, our friend had succeeded in having it go through his town.

In fact the National Motor Truck Development Tour had been scheduled to go through the other town, but the day before it arrived, the advance men reported the route had been changed.

The bragginest man in town was the reason. He had got busy. He had got results.

We're not urging you to brag, but if you must, brag about something accomplished, not something you hope to do.—*"Service"*—Service Motor Truck Co.

Edison Storage Battery Co., Orange, N. J., has just issued volume 1, number 1, of its new house organ and trade quarterly—"The Grid." Its purpose according to its editor is, "To disseminate some sense and a little nonsense among users of storage batteries."

New Diamond T House Organ

The "Diamond T Accelerator" has made its first appearance as the house organ of the Diamond T Motor Car Co., of Chicago, and a careful reading of this initial number will convince the reader that here is a little magazine well worth reading each time it is issued. Alexander Gray, manager of the sales promotion department of the Diamond T organization, is editor of the new publication. Its contents are well chosen to interest Diamond T users, dealers and prospects, and it is particularly well illustrated. One of the features is a panorama picture of the trucks of the National Motor Truck Development Tour, just before the start from Chicago. Two Diamond T trucks made that tour.

The editor, Mr. Gray, is an expert with the camera as well as a good editor, and several of his pictures serve to illustrate the pages.

The Proper Use of Kerosene

We learn that some mechanics recommend filling the crankcase with kerosene after draining the oil, and running the motor for a minute or two on kerosene instead of lubrication oil. We certainly do not recommend this practice because Oldsmobile engines are made with force feed oiling systems (the best known system today) and it is certainly undesirable that the various oil passages, for instance the drilled crankshaft, be filled with kerosene which is impossible to get out and which merely dilutes the fresh lubricating oil after the kerosene has been drained and the motor refilled. It is a good practice, however, to wash out the crankcase with kerosene **without running the engine.** But before refilling be sure that the kerosene is completely drained.—*The Oldsmobile Pacemaker.*

Motor Registration Constantly on Increase

According to the latest authentic automobile and truck registration figures there is one motor vehicle for every fifteen persons in the United States. The total number of passenger cars and trucks listed is 6,786,550. This is an increase of 13 per cent. over the registry on January 1, 1919.

Eisemann Magneto Corp. recently published the first issue of "The Eisemann Mag" which is a house organ in the true sense of the word. It is aimed to use the "Mag" as a method of communication among the 800 men and women employees of the company.

Midwestern Tire & Supply Company, Decatur, Ill., has been organized to handle a full line of automobile accessories.

Activities of the Motor Truck Association of Philadelphia

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THE COMMERCIAL CAR JOURNAL OFFICIAL ORGAN

Welcome Home Members From the Service

The opening fall meeting of the Motor Truck Association of Philadelphia, on Wednesday evening at the Hotel Adelphia, was a Welcome Home event for twelve out of 29 members of the association who had served in the United States Army and Navy during the war and had returned from overseas or domestic military service. The occasion was one of patriotic good-fellowship and welcome. The occasion was also made a reception to Commander Angelo Ginocckietti, of the Italian battleship Conte di Cavour.

Among the guests present to extend a welcome to them were Congressman J. Hampton Moore, candidate for mayor; Judge Eugene C. Bonniwell and Commander Ginocckietti, all of whom in glowing terms praised the heroic work of the American forces in the war.

Judge Bonniwell made the official address of welcome for the guests of the evening. Judge Bonniwell lauded the service men for their part in making the world safe for democracy but sounded an omnious note on the labor unrest throughout the country for which, he said, he saw no intelligent or practical plan of solution. He said government could suppress lawlessness but could not kill an idea, and the solution of the country rested more on the education of the masses to true Americanism. He said democracy would have to be practiced as well as preached, to give every man an equal chance politically and industrially. He advised a more intimate concern on the part of the individual with state affairs—citing as an example of collective influence the action of the grangers in securing the repeal of the daylight saving bill.

Commander Ginocckietti made a happy speech of tribute to the American Army and Navy and the Red Cross for its work in his country.

Mr. Herbert J. Tilly, of Strawbridge & Clothier, made an appeal for the Philadelphia Orchestra, saying the orchestra brought to Philadelphia $150,000,000 in business and in advertising. Mr. J. C. Schwartz is chairman of the Truck Association Committee to raise funds.

Congressman Moore's address on "A Word to the Boys" and "Greater Philadelphia," was characteristic of his vigorous appeal to Americanism. He discounted Judge Bonniwell's views on the dangers to America from unrest. Mr. Moore said the motor truck men had a strong champion for their cause in George M. Graham, who has appeared before congressional committees and secured considerations that would not otherwise have been granted.

"The motor truck today," he said, "is just as much a necessity as wheat and sugar, and I am glad I had the pleasure of being on the committee that framed your tax bill. We heard so much of trucks we came to regard them almost as important as religion and education. It came in for a long portion of glory for the winning of the war. The railroads are in trouble under government control and are soon to be returned to the owners who are in fear as to what may happen to them. But we have a substitute in motor trucks and in my old hobby—inland waterway. So our transportation troubles are only temporary. The motor truck today is backed by the strongest man in the country today—the farmer. His old prejudice against it is gone. He has found the automobile and truck are indispensable. You are important factors in the internal improvement of the country. When the railroads broke down during the war you saved the day. You stood back of these boys here and carried their ammunition and guns and food. It took weeks to make shipments from here to New York—and you did it in hours. The country suffered for food—and you carried it. Men were thrown out of work because their product couldn't be hauled to market. You hauled it and they resumed work. Waterways, too, came into vogue again and they will help more in the future. You extend transportation to a man's back door, or his warehouse, and haul to shipping points, rail or water. No longer are we dependent on inadequate railroads. You have revolutionized highways—improved property values, made wealth. Your industry is a great agency for good which justifies your pride in your business."

E. J. Berlet secured the endorsement of the association of the Rotary Club's campaign for safety to pedestrians crossing streets, their slogan being—"For Safety's Sake—Cross at Crossings." The committee appointed were: Herman H. Schwake, W. W. Woodruff, Thomas Downer, J. C. Schwartz and R. F. O'Brien.

Wm. C. Ash, Director of Vocational Education for Philadelphia, made an interesting address on his work and asked for the association's co-operation in establishing an auto-mechanic's department for his school. A committee was appointed to confer with the Board of Education, which consisted of Walter Y. Anthony, J. Harry Schumacker and W. A. Sutherland.

W. H. Metcalf read a letter from the Secretary of State of Pennsylvania, advising that contrary to reports there is no law to compel all trucks to equip with pneumatic tires after January 1.

Trucks Are Helping to Reduce H. C. L. in New York

Commissioner of Markets, Dr. J. P. Day, aided by an exporter of food products and motor trucks, has in operation a plan for reducing the high cost of living. It consists of utilizing trucks for distributing food products direct to the consumer, thereby eliminating the several handlings and additional costs incurred with conventional selling methods.

The exporting house meets all expense, employing discharged soldiers at $5 a day to act as salesmen, and engaging motor trucks for distribution. The trucks are loaded at the warehouse of the exporter and routed so as to cover the boroughs of New York. The trucks haul capacity loads to a given point or terminal and distribution is increased by the use of horses. A soldier accompanies each vehicle as salesman.

The plan has been very practical from every standpoint. It affords the consumer an opportunity to purchase staple food products considerably less than the quotations of the Fair Price Committee of the city, as well as affords employment to the discharged soldiers. The exporter obtains about eight per cent. gross on his investment and pays all expenses. Some idea of the distribution may be obtained from the statement that one truck distributed 80 cases of eggs in a day. Distribution began with ten trucks, which number was increased to 25 within a few days. Within a week it is expected that 75 trucks will be utilized. The city officials are co-operating despite the protests of the retail stores. Police guard is supplied each truck. Commissioner Day is well pleased with the success of the plan and statement is made that plans are contemplated for eliminating the many handlings of food products and that the truck will play an important role.

Atterbury Motor Car Co., Buffalo, N. Y., is going to build large additions to its plant. These will practically double the manufacturing facilities of the plant.

Quality Service and Cut Prices Will Not Mix

Here's Another Good Article on the Merchandising of Motor Truck Tires. Some Pointers on Obtaining Leads

By C. S. PERRIE

An experience of fifteen months has convinced C. A. Niles, of Brodie & Niles, Burlington, Vt., that merchandising of solid tires with a tire press is profitable for a truck dealer and that tires can be sold in the face of considerable competition if the right kind of a sales policy is adopted.

This concern sells both trucks and passenger cars as does the average dealer in the smaller cities and towns in northern New England. Charles Niles, who is the active partner, investigated the possibilities of merchandising solid tires with facilities for pressing them on. His investigations resulted in the purchase of a press, a Wellman-Seaver-Morgan, in July, 1918, at which time solid tires and bands were also stocked. The decision was largely influenced by the fact that the nearest press was at Springfield and that users of trucks were not being afforded service. In a number of instances owners were delayed beyond a reasonable time and this proved a severe handicap, particularly where heavy winters interfered with the use of the trucks.

Talk Service Not Discounts

The tire department has been successful but like every new department, the business had to be developed gradually. After the press was installed and a stock of bands and tires purchased an advertising campaign was started in the newspapers calling attention to the truck tire service furnished by the company, through the installation of a new tire press. There was the usual mail publicity campaign. This was followed up by engaging a truck tire salesman, a man who knew transportation and every angle of tires.

This salesman prepared his lists of truck owners in the territory and with a potentiality of 150 to 175 trucks was afforded ample opportunity to display his ability. He is not an office chair salesman, but he goes after the trade, traveling throughout the territory. His policy is to call and inspect the tires on the trucks of his prospects, noting if renewal be needed or if there is any misalignment of the wheels.

If a new tire is needed the owner is approached on the service basis, discounts being entirely eliminated from the transaction. In connection with the opinion in general vogue that the customer's interest is centered only in prices, Charlie Niles' solution is that in the majority of cases this tendency is caused by dealers offering attractive discounts in order to get business—at the sacrifice of service. Mr. Niles declares that he can obtain his share of the solid tire business in his territory without shading prices and the fact that he has disposed of 125 tires in eight months would appear to sustain his contention.

Mr. Niles claims that there are only two discounts to be given if a dealer expects to make a profit on his tire department, a 10 per cent. discount to dealer and a 5 per cent. discount to customers for cash payment.

Must Consider Overhead

"Few dealers entering into the merchandising of truck tires, whether solid or pneumatic, take into consideration their overhead," said Mr. Niles. "The space occupied by the press, bands and stock, represent a fixed charge in the overhead. Then there is the lighting and the current used for operating the press as well as the cost of labor, salesman's expenses, advertising, share of office expense, etc., a proportionate share of which should be charged against the tire department. If some of the dealers who offer an extra ten per cent. or two to land a sale would do a little figuring on their overhead there would be less gyping of tires."

Every employee, particularly the salesmen of the various departments, are expected to co-operate in the matter of leads or prospects. In running copy in the papers, emphasis is laid upon the service angle and service is talked first, last and always. No seconds or mongrel makes of tires are stocked. Confidence in the goods of the representative makers is preferred.

The company does not consider the attaching of tires equivalent to a discount. A charge of $2 for pressing on and $2 for taking off is made for each tire. A dual tire is considered as two tires. This is done to pay for the press and the policy is based on the supposition that the press, being a piece of machinery, has a predetermined life that will after a certain number of years require replacements. The pressing on of tires is not confined to those owners considered patrons, but is extended to any owner desiring the services of the company at a similar rate.

Competition is Dead

Shortly after the press was installed another concern followed suit. This company had the right idea, but wandered from the path of success almost at the outset by offering attractive price-cutting rates to the owners. Competition of this nature will sooner or later prove fatal as it can be easily met from the service angle. Of course, the price cutter flourished for a while but the writer is informed that although his business still exists it is not sufficiently extensive to cause any anxiety. Service policies despite cut prices won out.

The company has not had easy sailing in the merchandising of truck tires. According to Mr. Niles a certain manufacturer or his representative signed up with a local concern, not an automobile dealer, for a certain amount of tires. Statement was made that this party who owned a few trucks, gave out the impression that he could sell a large number of tires to his business acquaintances. This would have been perfectly legitimate, but later events brought to light that he shaded prices considerably, which facts being reported to Mr. Niles by his tire salesman led the former to make reprisals. Accordingly the next time the tire representative visited Mr. Niles he was fully informed of conditions and it was hinted that if the gypper continued his depredatious sales, he, Mr. Niles, would unload his stock by one of three methods: sell at cost, advertise to sell at cost, or return the stock to the factory with an explanation of conditions. It is fair to the tire maker's representative to state that he agreed not to supply the "business man" dealer in the future.

Exclusive Sales Rights

Mr. Niles hazarded the opinion that much of the trouble experienced by legitimate dealers with the "gyp" type would be avoided if the tire manufacturer would have but one dealer or representative in each locality, provided, of course, the dealer is a live wire. The thought is that a truck dealer making an investment in a press, bands and stock of tires, would be unquestionably encouraged to make greater efforts to merchandise, if he knew that greater selling costs would not be incurred, incident to competitive dealers pursuing illegitimate selling methods, in the disposal of the same makes of tires. For this reason one dealer should have indisputed right for the exclusive sales of any particular make of tire.

The truck dealer installing a press and truck tires should, according to a dealer who has passed through the experimental stage, avoid giving credit. A certain dealer who sold a representative line of trucks in a small city in New Jersey found that his customers were going out of town for their tire replacements, so he stocked tires and installed a press. In his anxiety to merchandise tires he gave credit. He soon mended his ways, refusing credit to all except large corporations or concerns of reputed standing. At first this dealer found it difficult to refuse credit to his customers, men to whom he had sold trucks. However, he soon placated all remonstrances. As he had sold several trucks he had several

customers for tires, which he could ill afford to lose.

Quoting an experience of this dealer affords a concrete example of loss that may be incurred by the credit plan. A young man purchased a truck on the time payment plan. The first few payments were met promptly, then occurred an accident which required a number of parts and many hours of labor before the truck was placed in shape. Misaligned wheels also made it necessary to replace a tire so the owner ordered a new tire. It was included in the bill. As the truck was out of service for some time the income of the owner was seriously curtailed. The bill and a note came due about the same time. The owner had difficulty in meeting the note and asked for time on the bill. A severe illness prevented the owner operating his truck for several weeks so the next note had to be extended and the repair bill was still on the books. To make a long story short it was months after the truck was paid for before the repair bill and tire were paid for. Considerable friction, tied up money, and cessation of further patronage was the result of this apparently friendly but unethical business principle.

This same dealer now gets cash for his truck tires. The owner is informed that all tires are cash and cash is secured before the truck or wheel leaves the place. The owner is told that the cash discount is worth saving, and that the tire department is separate from the repair and truck department. Of course, it is not a cast iron rule. It is sufficiently flexible to care for certain contingencies but the cash rule has worked out to the satisfaction of all concerned. If a customer whose credit or standing is doubtful, kicks and threatens to go elsewhere for his tires he is allowed to do so. This dealer wants business but not losses. Two or three losses means money.

Sells for Cash Only

The Union Garage Co., Inc., Perth Amboy, N. J., is another truck and passenger car concern that has made a success in merchandising truck tires. This company was, at the time visited by the writer, handling Goodyear and Goodrich solids and had been merchandising these tires for over a year. No credit is given other than to big companies. Cash is the rule and it is tactfully explained to the customer why. The company keeps a tire salesman on the road with a car, and despite keen competition this salesman is putting them over. He has an index or file of truck owners in the territory and the data includes the size and make of the tires used, their condition, etc. Records are maintained of calls, inspections, etc., and in this way the salesman's time is conserved.

Selling the "Bumper"

E. J. Denning, Stamford, Conn., dealer in Mack trucks, and whose experience in merchandising truck tires was described in the June issue of the COMMERCIAL CAR JOURNAL, obtains many leads or prospects by instructing all of his employees to take the number of any truck with tires that "bump." "The owner is then located," said Mr. Denning, "if in my territory, and informed as to the damage possible to the truck. Service talk is then indulged in, next quality of the tires I sell, then salesmanship is practiced. And we invariably sell." Dealers merchandising tires, particularly those having a number of employees, will find this lead system practical. The plan could be further improved by posting a notice in the office, salesroom, repair shop and tire department to the effect that any employees supplying a lead will be given a bonus or reward if a sale results.

Value of Recording Sales

It is suggested that the truck dealer adopt some method of keeping track of his sales and that the record include a number of facts essential to the service policy. That used by Mr. Denning

Name of Truck	
Owner	
Make of tire	
Date applied	
Wheels	Size
R. R. No.	
L. R. "	
R. F. "	
L. F. "	
Hrs.	Applied by

Service Record Slip

Used by E. J. Denning, truck tire dealer, to record sales and service of tires sold. It supplies valuable data for the salesman as well.

is a simple form and inexpensive. It provides for the name of the truck, owner, make of tire, date applied, wheels, size and location; hours labor and by whom applied. The records are filed and will prove invaluable when the service of a tire is questioned as well as aid the salesman in maintaining his records. Data compiled from these slips also affords the dealer an opportunity to note the service obtained from the tires he represents, and whenever particularly good service or mileage is obtained the figures, either miles or cost per mile, supplies the salesman with good ammunition. Right here it should be observed that many owners entertain queer ideas as to the service obtained with tires.

One of the greatest problems in the merchandising of truck tires is, according to a number of truck dealers interested in the possibilities of exploiting the field, how standard prices can be maintained in a place infested with price cutters? A number of truck dealers have informed the writer that if the price cutter could be eliminated they would stock tires and install a press. Some of these dealers do not believe it possible for a dealer to maintain set prices with this type of competition and relate all kinds of fearsome tales about what these price cutters will do to get business.

The writer admits that there is competition, keen competition, and perhaps questionable sales methods in some places if the stories told are even partly true. There is competition in every industry whether it be selling trucks, groceries or baby carriages. It is truly said that competition is the life of business. Were it not for competition there would be monopolies and with monopolies there would be no service. Quality plus service cannot be given by the price cutter for any great length of time. He is eventually eliminated by a process of evolution and it is working much faster in these days with the increasing cost of overhead. The gyp type of tire dealer cannot prosper, particularly in the smaller places, for education plus experience is undermining his defenses.

These may be platitudes but the writer is confident that in the process of reconstruction the gyp will be relegated to the background. The great trouble with too many dealers is that they anticipate cut prices or attractive discounts before they approach a prospect and with this thought uppermost in their mind they fail to put over a good, strong quality plus service talk. Too many salesmen allow a prospect to run on a single track, the discount track, instead of switching him over to the quality and service track. The average prospect for tires is always interested in costs. Every good buyer is. But isn't he buying quality and service?

A Selling Analogy

An incident illustrates the contention. The writer was discussing transportation with the owner and buyer of a fleet of trucks in a New England city, a town that has the reputation of being the most difficult in the East to merchandise truck tires. Outside of the office on the salesmen's bench were six callers, all of whom it seemed were waiting to see the buyer.

"Truck tire salesmen," remarked the buyer when his attention was called to the waiting men. "They can wait."

"What tires do you use?" I asked.

"Nothing but the 'Best Ever,'" was the reply.

"Thinking of making a change?"

"Decidedly not."

"But you are going to see each salesman?"

"I am," was the reply. "I always make it a practice to listen to their sales arguments, for I may be able to make use of some of their ideas in my business.

Now some of those young men will offer me very attractive inducements if I will only try their tires. And no doubt some may be as good as the Best Ever. I have been through this tire buying proposition and until I sold the Best Ever did not know what quality and service really meant. I buy from Billy Green, salesman for Service Truck Co., and since Billy began to look after my trucks I have no troubles or worries about tires."

"How did this Mr. Green sell you?"

"Well, to make a long story short he sold me on his quality plus service basis. I remember one of his arguments that appealed to me that attracted my attention. He talked quality and service until every other word seemed quality or service. Finally he said, 'Mr. Kingston, you use quite a lot of belting in your plant, don't you? Well, why don't you use the Cheaper and Best belting instead of the Wear Ever? It costs considerably less and they tell me it is as good as the Wear Ever.'

"'Why,' I replied, 'experience has taught us that cheap belting is dear at any price. The breaking of a main belt in a department means a considerable loss,' and I went on to explain as Green seemed quite interested.

"'Can't get away from that argument,' he said, 'and that's just why you should use the Best Ever tires. You get service and without it your trucks can't be run at a profit, etc.' That was the beginning. I tried out a pair of the Best Evers and bought them at the list less cash discount price."

"But," I interrupted, "couldn't you have bought equally as good a tire and obtained a better discount from some other dealer?"

"Yes, I might, but when I talked a better discount Green came back with another one of his analogies. He asked me if I cut price on my product and, of course, I told him no. He wanted to know if I did not give service and I admitted service was my first name. He then asked me if it cost me anything to give service. I said it did and then some. And some more questions of a like character. Then the young man proceeded to show that it costs money to sell the Best Ever tire, to buy, operate and maintain a press, to give inspection, to maintain a car to give service, that there was interest on the investment of tires and a press, power and light bills, rent, insurance, and a lot more of overhead. And he convinced me that any tire dealer giving attractive discounts could not give service and make a profit. And I have stuck to the Best Ever since and will while quality and service continues."

Later the writer had an opportunity of meeting the salesman who did not seem to be worried when told of the line of his rivals calling on his customer. "Glad of the tip, though," he said. "I'll be just a bit keener in looking after Mr. Kingston's trucks. Yes, there is a lot of gypping in this burg but I am not in competition with the gyppers. I find that it is more profitable developing a clientele like Mr. Kingston and there is plenty of opportunity despite the fact that about every make of tire is represented here. It has been a long and tough fight to put over the no cut price plan but we are cashing in on it and I guess there are a few Best Ever tires in this section and there's going to be more and, excuse me a moment, there's one of my trucks now with a wheel out of alignment. 'Hey, Bill,' to the driver. 'Wait a minute. Say, Bill, that front left wheel is out of line. Drive her over to the station, will you? Won't take a second and I have a good cigar for you to smoke while we straighten her up. Aw, come on, Bill, won't take long. Be a good chap,'" and so on. Bill went.

Brodie & Niles 121-25-29 ST. PAUL ST. BURLINGTON, VT. **Phone 1050**

TIRE RECORD

№ 654 Date of Invoice_____

Size_____ Make_____

Serial No._____ Bead & Tread_____

Sold to_____

Address _____

Date_____ Price_____

When Tire is sold turn THIS TAG in to the office

№ 654 **OFFICE TAG**

Size_____ Make_____

Tread_____ Bead_____

Number_____ Date Sold_____

When this tag is attached to a tire detach this stub for Book-keeper

BRODIE & NILES

Tire Record Card

The upper section is attached to the truck tire and the stub filed at the office. When the tire is sold the upper section is filed with the stub, affording information of value to the dealer.

It later developed that Bill was starting on a haul of about 75 miles and the tire salesman later figured out the wear for that distance if the wheel had not been aligned. Another kink in this salesman's makeup was his handling of the drivers of his clients. He was one of the boys, always appeared pleased to see them, and if he met a driver in a public place he was as friendly as though talking with him in the garage. In other words, this salesman was a good mixer, believed in cultivating the drivers and, invariably, he obtained good results, for when he suggested care of the tires he was listened to on the basis of good fellowship. This salesman realizes that good tires can give poor service when abused.

Observations among successful merchandisers of tires and other automotive equipment has convinced the writer that the average salesman or those who do not make money for their employers in the long run are the type that permit the prospect to put over the price argument. Too many salesmen fall for the old story of the other dealer who quotes an extra ten or a couple of tens. It may be that some do but too often the prospect gets away with it. It is bluff pure and simple. If your salesman can be bluffed or yourself either Mr. Dealer, you are not merchandising. Neither are you a real salesman. If you can't merchandise tires, sell quality and service, you won't be successful in gypping the gyp and he will flourish. Just sit down and figure out costs as did Billy Green, get your real overhead, and you will see why quality and service and cut prices won't mix.

Horse-Drawn Equipment Giving Way for Motor Truck

Street commissioners throughout the United States and Canada have brought out some interesting facts and figures relative to the great savings consummated through the replacement of horse-drawn equipment by motor street flushers, according to reports compiled by the Federal Motor Truck Co.

The report of Andrew Macallum, Commissioner of Streets at Ottawa, Canada, is typical: "Each of our flushers mounted on motor truck has replaced ten horse-drawn outfits. Two 1000 gallon power flushers mounted on 3½-ton trucks operated all of 1918, flushing an average of 18 miles of pavement, of all widths, per day at a cost of $1.72 per mile. The total cost was $4650 for 150 days of actual operation. The teams formerly used accomplished this work for $16,800—a direct saving of $12,150. And the streets were washed cleaner than ever before. This means that 2700 miles were flushed cleaner than ever before by two trucks as compared with 20 horses at an actual saving of $12,150."

In Jackson, Mich., W. B. Hodges, City Engineer, in his report says: "Prior to the first of August, 1918, the street cleaning equipment consisted of two horse-drawn machine brooms with sprinkler attachments. Two teams and six men were required for brushing and loading. A Federal flusher, which was put on the job, effected a saving of $12 per day for teams and required only four men to brush and load."

Van Sicklen to House Employees

ELGIN, ILL., Oct. 30.—The citizens of Elgin have decided to grant the Van Sicklen Speedometer Co. a tract of land worth about $50,000 and also to finance a home building corporation which will enable the employees of the company to eventually own their own homes. The company had threatened to move its plant from Elgin unless the city came to its relief and provided housing facilities for the additional employees which its contemplated expansion would necessitate.

Selling Trucks to Farmers Facilitated by Intimate Knowledge of Their Hauling Problems

New Jersey Dealer Builds Up Large Business by Offering Trucks Equipped With Bodies Suitable for Customers' Needs

By J. W. COTTRELL

View of H. A. DeHart & Son Motor Truck Company

H. A. DeHART & SON, of Thorofare, N. J., 12 miles from Philadelphia, Pa., are distributors of Fulton, Brockway and Norwalk trucks, covering the territory of Burlington, Camden, Gloucester and Salem Counties in New Jersey. There are a number of cities and towns in the territory but the bulk of the business is done in the farming section which is a part of the supply zone for Philadelphia, Pa. They also sell Velie and Scripps-Booth passenger cars but trucks and bodies constitute their foremost line.

Sales are made principally to farmers who require conveyances for the shipment of produce to the markets in Philadelphia. It is not practical to express by railroad because the shipment must first be hauled to the freight station, then be carried by rail to Camden, N. J., thence across the Delaware River on car floats, unloaded and finally hauled from the station to the market. This handling takes some little time and is surely not beneficial to perishable produce.

Farmers within driving distance take their produce to market in two-horse teams. This means at best an all night trip at a time when the farmer has troubles enough getting the produce ready for market. By the use of trucks the time for the trip is cut down to a few hours. Trucks can make better time from the farm to the market than the railroad shipments and the shipments also reach the market in much better condition.

In 1916 the DeHarts started selling trucks. In 1918 they sold approximately 100 trucks. The reason for this measure of success should be of interest to every truck dealer.

The business was started over thirty years ago, building wagons and bodies. The DeHart farm wagon was well built and designed for farmers' needs. The business increased year after year and the reputation of the DeHart plant was established for square dealing and well made product. With the coming of motor transportation, DeHart started making bodies for trucks. The design followed closely the wagon body already proven suitable for farmers' work Being in close touch with farmers who were in the market for trucks it was a logical step to take on the sale of the trucks. The plant is now 200 ft. by 60 ft. one story frame building with no interior posts. The one building contains the sales floor, paint shop, blacksmith shop and work room for service, woodworking and body shop. The office is in a dwelling next door.

In the territory several dealers have been appointed but most of the area is handled by traveling men. The first call on a prospect is made by the representative in a touring car. While the advantages of truck transportation are being pointed out, information, the important object of the visit, is obtained as to the size of the farm, the kind and quantity of crops raised, whether any hogs or cattle are hauled and the farmer's idea of the type of body best adapted to his needs.

The next visit is made, not with a chassis, but with a truck equipped with the type of body in which the farmer is interested. A demonstration is made with a load of the farmer's own produce. Sometimes a trip is made to market to show that the produce will carry better in a truck than in a freight car. The price quoted includes the chassis, body, lamps, mirror, license and insurance against fire. The reason for including the license and insurance policy is that the buyer of a truck does not know the exact weight, size of body, and other

Fulton Model FX 1½ Ton, Equipped With Shelving Type Body, Which Will Carry 135 Five-Eighths Bushel Baskets, and is the Same Design Which Has Been Used by South Jersey Farmers for Fifty Years

detailed information necessary to secure a license or to have the car insured. The dealer has this information right at hand. This seems like a small point but it is greatly appreciated by customers.

The importance of showing a complete truck rather than a chassis was emphasized by Mr. DeHart when he said, "If you take a chassis to a farmer to demonstrate it to him and say this is a 2-ton truck, he cannot see the ability of that chassis to do his work. He is not impressed with the advantage of a truck. But take that same chassis and mount a body on it made to carry, say 200 baskets, and then show it to the farmer. Load 200 of his baskets on it. Immediately he not only sees the carrying capacity of the truck, but it brings home to him the fact that it can be utilized profitably for his work. He can easily be convinced of the advantages of the truck."

The DeHart business furnishes two other proofs of the importance of the body in selling a truck. H. A. DeHart & Son introduced the Fulton truck into this section when it first came on the market. The truck might be new to their customers but the right body was not. Literally at first the body sold the truck. At the last dealers' convention at the Fulton factory first place among dealers was given to H. A. DeHart & Son, not because he made the most sales, but because comparative conditions and size of the territories, indicated that a greater amount of effort and selling ability was required to overcome otherwise sterile territory.

Other truck dealers are constantly buying DeHart bodies to put on their trucks for delivery to farmers. Purchasers of other truck chassis also come to the DeHart plant for their bodies. Sometimes they have to wait until a body can be built to fit their chassis. The appearance of a body finished and ready to be placed on a chassis that is for sale on the sales floor or a complete truck ready to go to work is a salient, unvoiced sales argument. This is another reason why the next order for a complete truck will be placed with DeHart. When a customer wishes immediate delivery a dealer who cannot supply a body loses a sale.

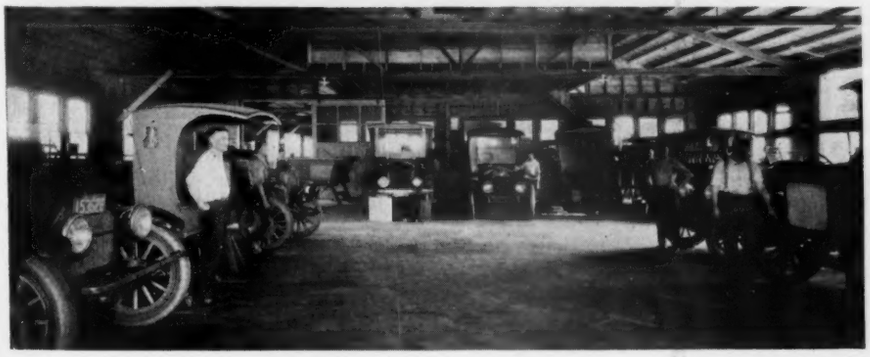
Several rural express lines are running regularly in this section taking produce to Philadelphia. Some lines have two or three trucks, each making daily trips in the busy season. The question of service has been given careful attention by H. A. DeHart & Son. A stock of parts is kept on hand and also "service" parts such as magnetos, wheels, springs and other parts put on customer's trucks while parts are being repaired. If a customer's truck has trouble a man is sent out on request, no matter how far away to repair it. If the fault is due to a defect in the truck no charge is made for the work. Defective parts are replaced free of charge at any time they show defects. There is no definite time limit to this guarantee.

When a new truck is delivered a man is sent out with it to stay as long as necessary to teach the owner or his driver, or both, how to drive it, how to lubricate it and take care of it and how to make minor adjustments. Many trucks are put out of commission by neglect or ignorance of the requirements of the truck with the result that the trouble is usually blamed on the truck. This plan of instruction at the time the truck is delivered prevents such trouble later.

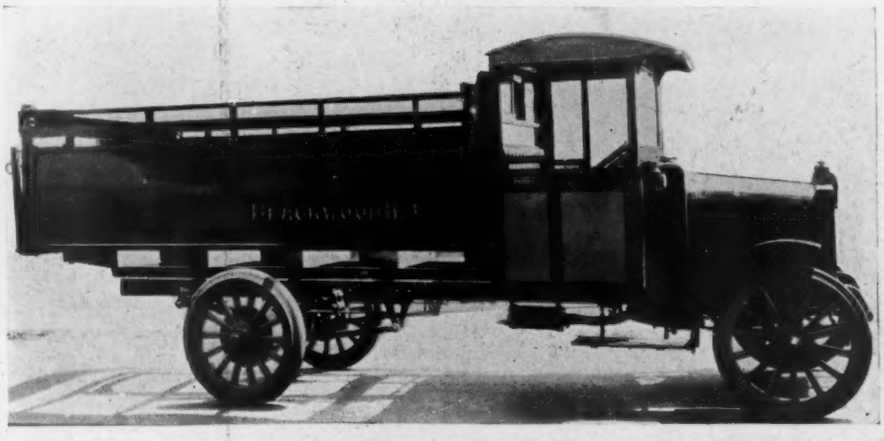
Pneumatic tires are not used extensively in this section because they are

Interior of Blacksmith Shop and Service Station

Interior of Sales Floor



Interior of Paint Shop



Brockway Special Model S, Three and One Half Ton, Equipped With Square Type Body, and Has a Capacity of One Hundred and Forty, Five-Eighths Bushel Baskets

not as yet convinced that the advantages of the pneumatics offset the disadvantage of the care necessary for the pneumatics when the truck is not in use.

The DeHart business shows that there is a big field for the sale of trucks in the country. The business can be obtained if the dealer goes about it properly. Dealers selling trucks to farmers must study the needs of this class of customers. The body will often make or lose a sale.

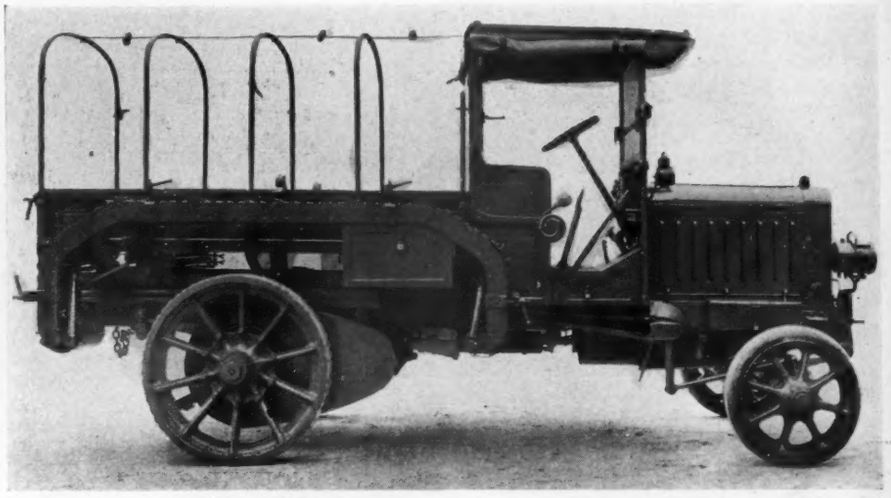
Not every dealer can be or wishes to be a body builder but by giving the body question more attention and being in a position to show a complete truck to a farmer he can overcome one of the biggest handicaps to farmer sales.

Foreign Road Tractors of Heavy War Construction Have Tremendous Pulling Power

Can Pull a Hundred Tons on Level and Twenty-Five Tons on Fifteen Per Cent Grade

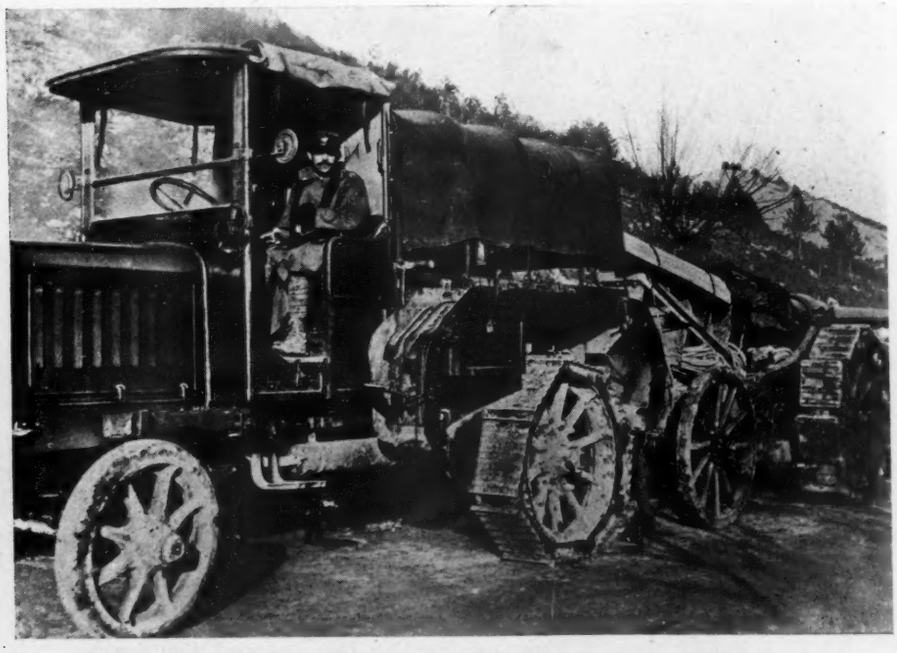
FOR hauling heavy guns during the war the most extensively worked machine was the big 70-hp. Fiat road tractor, which, while used throughout the Italian artillery service, was also employed by the French. The enormity and power of this machine can be readily conceived when explained that this machine empty weighs nearly 8 tons, and is also capable of taking a load of 3½ tons on its relatively small platform. It was claimed to haul 100 tons on level roads, and 25 tons up 15 per cent. grades at a speed ranging from 1 to 8 m.p.h.

Its engine, which has four cylinders, with a bore of 5⅛ in. and a stroke of 8⅛ in., provides four speeds, having a normal speed of 1000 r.p.m. The power is transmitted to the wheel through side chains, which are enclosed in cases sufficiently substantial to take the weight of the machine in case the wheels become embedded in soft earth. The front wheels call for no remark, but the back are of a specially patented construction, designed to carry around their circumference an endless steel band for traveling over awkward ground. In the accompanying illustration one of these bands can be seen in position. When these bands are not in use they are carried on a platform, one on each side, which also act to some extent as mudguards for protection against the mud-throwing action of the back wheels. These bands, however, are only put on when the roads are in very bad condition, or when the tractor has to operate over land so soft or slippery that additional steering surface or increased adherence are necessary.



Fiat Heavy Road Tractor for Artillery Haulage

In addition the machine is also fitted with a powerful winding drum carrying 60 yd. of 15 mm. steel cable for use when direct haulage is absolutely impossible.



Fiat Artillery Truck and Road Tractor at Work on the Italian Frontier

Hauls Axles With Own Trucks

Some time ago when the railroads were so short of cars that traffic was badly congested, the Clyde Cars Co., Clyde, O., was badly in need of axles for its trucks.

This company took one of its 5-ton Clydesdale trucks and sent it to the Timken plant in Detroit. The trip was so successful that the company has been hauling its own axles ever since and finds that it is cheaper and more convenient than shipping by railroad.

Motor Trucks From a Practical Engineering Standpoint is the name of a pamphlet recently issued by the International Motor Co., New York City. It consists of a discussion on commercial vehicle design and manufacture from the viewpoint of the purchaser. It explains in simple language the features of the Mack truck and why each feature has been adopted.

Selling Trucks to Farmers

By H. R. BRATE

TALK about prospects for motor truck sales, if the woods are not full of them then the farms are. There are 1,860,000 farms in this good old U. S. A. containing one hundred acres of more of honest-to-goodness soil, and every blessed farmer is a live truck prospect. He has got to have them, and that is all there is to it. Less than 80,000 of them have trucks now, so the picking is still good.

It is up to the truck dealer to get busy, for the farmer is up against a real proposition, if the figures of your Uncle Samuel are anywhere near reliable, and he usually is about right. Just note this: A few years ago, and not so many either, seventy per cent. of the population lived in the country—on the farm, and thirty per cent. lived in the cities. Times sure have changed though, for what do we have today? We have about the same figures except they are headed the other way. Thirty per cent. on the farms and seventy per cent. in the cities. Say what you will, it is an alarming condition, that is, it is more alarming to the city man than it is to the tiller of the soil, for you may rest assured Mr. Farmer is going to fill his stomach first. What is left goes to the city dweller.

The farmer isn't quite as selfish as he is usually pictured. He is willing to divide and then some. If he hadn't been, we would have been starving several years ago. However, he can't do it all, and it is up to the truck dealer to go out into the highways and the byways, and show Mr. Farmer how he can market bigger crops at a fraction of the cost of hauling he is now employing. Incidentally you can show how it is going to mean more money in his pocket, which will interest him most of all.

Attentive to Help

The fact that they have already bought close on to eighty thousand trucks, indicates that some dealers have found that the farmer is willing to listen to truck arguments. He is anxious to listen to anything that will help him out on the labor situation, for believe as you may, he is strictly up against it. He must have help or he will become discouraged, and when he does, heaven help the city cliff dwellers.

Disregarding all of these facts, and they are facts, there is another reason why the farmer is a desirable person to whom to sell trucks. And that reason is a very good one to the average truck dealer who knows some of the conditions that exist in some of our cities, the farmer will pay one hundred cents on the dollar, meaning list price, and if that isn't a good reason, why then I will stop the argument right here.

If the average man's heart is reached through his stomach, then the average farmer's pocketbook is reached by the "show-me" kind of argument. Take your truck out and show him just what it will do; show him how the truck is going to help him out in his labor problem. He is willing and waiting to be shown. The motor truck tour which recently completed some 3500 miles of "show-me" stunts in six different states, showed the farmers in those states what the truck will do. It is reported that on one farm in Iowa, where the tour stopped and demonstrated to a threshing outfit what a truck on the farm would do, four trucks did the work of eleven teams, and did it easily.

Letters Give Rise to Prospects

C. U. Williams, of the C. U. Williams & Son Co., Bloomington, Ill., is a dealer who is alive to the great possibilities of selling trucks to the farmers. He first compiled a list of farmers in his territory who could profitably employ a truck in hauling their produce to market, and then he sent them the following letter in which he set forth several good arguments why they should purchase trucks:

Dear Sir:

"Inasmuch as every farmer is putting forth every possible effort these days to make his time reach as far as possible, thereby increasing the value of each day, he is thinking of various methods of applying mechanical aid in doing his work. One of the most effectual applications to which a machine may be applied is that of saving time in the matter of transporting his farm produce to market.

"The average Farmer consumes approximately 40 to 50 man-days each year in delivering his goods to market. As the average distance between the Farmer and his market in Illinois is approximately four and one-half miles, it is practically impossible to deliver 3 loads per team per day; though some Farmers do reach that quantity, the big majority do not. In place of delivering one load in the forenoon and one in the afternoon, by using horses, you could deliver four loads in the forenoon and four in the afternoon with a MOTOR TRUCK.

"By thus equipping yourself with modern facilities for delivering your produce to market, you can make the complete delivery in approximately 10 or 12 man-days per year, saving in actual time an average of more than 30 man-days every year, of the time you now use in delivering your produce with the present equipment.

"Now, if I were to offer you a suggestion whereby you could make 13 months constitute a year instead of 12, as it now is, giving you that much more time in which to do your work, you would jump at the opportunity and consider yourself mighty fortunate. That is just what I am suggesting to you in the matter of using MOTOR TRUCKS for transporting your produce as compared with horses. Instead of putting in 45 days on the road, you can put in 10 or 12 and have the other 30 to do your farm work.

"In suggesting to you the adaption of the MOTOR TRUCK to displace your horse in moving your produce to market, I want to mention a word of caution that 'Motor Trucks' may be stamped upon many things that are not adapted to farm work. The truck we handle will not disappoint you, it will give you Truck Service. I am sure that you will think this over, and the more you think it over, the more you will think of it.

"Yours truly."

Attached to this letter Mr. Williams affixed a slip giving the names of several farmers who have purchased trucks and found that it saved valuable time.

Where replies are received or the farmer comes in, he takes a truck right out and shows him just what it will do and proves his argument to the farmer.

"The farmers in this country," said Mr. Williams, "are commencing to buy trucks, and it is only a matter of showing them how it is to their great advantage to own one. We find that by first getting the farmer in the proper frame of mind, and then taking a truck right out on his farm and showing him by actual performance what it will do, it isn't such a difficult matter after all to sell, and it has this advantage, is is clean money.

Trucks Become Prominent Factor in Transfer Business

A moving van recently made by the Federal Motor Truck Company, of Detroit, Mich., and which is owned and designed by Mr. T. F. Cathcart, of Atlanta, Ga., is probably the largest of its size ever manufactured. It is 26½ ft. long and 11½ ft. high and has a loading space of 835 cu. ft. Unloaded, the truck itself weighs 11,050 lb.

Its equipment is unusually complete. It carries electric lights throughout. It has a water cooler, front and side doors, which are locked with steel bolts, a driver's seat accommodating six and their luggage and locker for six lunch boxes. The double walls of this van are reinforced with steel and highly finished, making for an effective body that will greatly resist the wear of rough transfer service.

Because of its size and complete equipment, Mr. Cathcart christened his truck the "Lusitania." So successful has been its operations, that Mr. Cathcart has just received from the Federal Company a "sister ship," the "Leviathan."

Timber Man Explains How Moments of Truck Inactivity Can be Avoided

Sells Truck Service to Lumber Dealers. Drivers Have Interest of Employer at Heart, Being Encouraged by a Bonus System

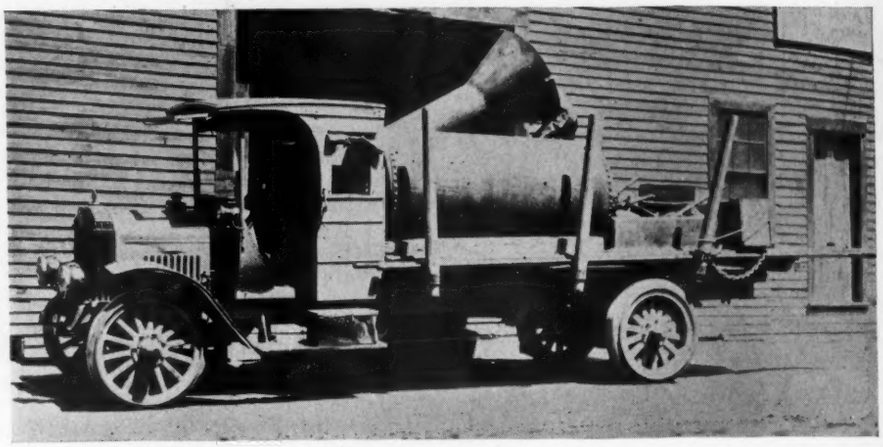
By C. S. PERRIE

IDLE time is not given the consideration due it when estimating costs of operation. Many owners make no allowance for the idle time, being content to figure costs on the basis of interest on the investment, depreciation, insurance, tires, garage, repairs, fuel, oil, etc. Whenever this policy is pursued the cost of transportation of a commodity is materially increased with idle moments. Some owners, however, offset this loss by renting or developing business for their trucks.

J. C. West, of Auburn, Me., affords an example of how trucks may be kept busy during periods of inactivity incurred by a business that is affected by climatic conditions or seasons. Mr. West is an old time lumber man; that is, for a great many years he has felled timber tracts, sawed the logs and transported the boards and planks to the mills and dealers in Auburn. In former years when the timber tracts were within easy distance of the city, use was made of horses, but gradually the distances between the point of delivery and the timber tracts have been widening until the hauls were beyond the practical and economical scope of the horse.

Wherever the tract was within convenient distance of a steam or electric railroad, use was made of the common carriers, but in many instances the double handling and freight tariffs proved costly. There was also the time factor, which was an important one during the war period when the railroads were taxed to their uttermost to provide service to the essential industries.

Three years ago Mr. West was interested in the possibilities of a 2-ton truck by the Indiana dealer in Lewiston, Me. This size was advocated and decided upon and the condition of the roads over which the truck would have to travel was a factor. Use of a larger capacity truck would have been profitable were it not for the fact that the roads do not favor the use of dual tires and the heavier truck. In connection with this statement the remarks of Mr. West are of interest. He informed the writer that demonstrations of 3½-ton trucks under the same conditions his 2-ton units operate proved that the smaller trucks were more practical from every standpoint. Mr. West also stated that after the heavier truck made several trips it experienced traction troubles because of the nature of the soil.



When the West Trucks Are Not Engaged in Hauling Lumber From the Woods It Does General Trucking. This Boiler and Equipment Was Hauled From Brunswick to Portland, Me. The Contractor Needed It in a Hurry.

Illustrating the Use of Idle Time, This Load Was Made Up Just Before Dinner, When the Average Driver Would Have Considered It Half a Day's Work. Note the Brace on the Frame of the Old Truck. The Severity of the Roads Necessitated the Use of This Auxiliary Frame.

Mr. West now operates a second 2-ton Indiana. He has found his trucks most profitable as means for getting his lumber to the market. He believes in keeping his trucks busy and as there are certain periods of the year when the machines are not engaged in hauling timber, as during the black fly season, he has developed a profitable business among the lumber dealers in Auburn and vicinity. This is he able to do because of his business connections. Whenever the trucks are not engaged hauling for the lumber dealers, and there is a considerable volume of this work, the drivers generally are able to find work for the trucks. Both men have the interests of their employer at heart and, being encouraged on a form of bonus arrangement, sell the services of the truck as well as obtain prospects.

Trucks Are Rented on Day Basis

Trucks are rented to the lumber dealers on the day basis, although it frequently happens that the services of a truck will not be required the entire day. Mr. West charges $25 a day and says he is making a profit above all expenses at this rate. He attends to the routing from his office and the drivers call him at stated hours to arrange for the work of the coming day or, if a truck completes a job and has an hour or two remaining, a short haul job is supplied. For example: On the day the writer visited Auburn the trucks were engaged in the morning up to 11 o'clock hauling for a local lumber dealer. Ordinarily the average driver would kill time until his dinner hour, but not so with Mr. West's man. He called the office and found that he could haul a load of shingles from the freight yard

to a lumber dealer and he did, using the hour to a good advantage. Furthermore, this driver helped the other truck driver load his shingles.

Haul Lumber to a Farm

The marked superiority of the truck over the horse was demonstrated by the trip to a farm about five miles outside of the city. The farmer ordered boards, shingles, nails, etc., from a dealer and desired them in a hurry, although the building had not progressed to that state where the material was required the day of delivery. The haul was over bad roads, sandy and full of rocks, and there was a couple of stiff grades, one of which would limit the capacity of two horses. The truck made the round trip in one hour and this time included a delay while the farmer and his helper shovelled a pile of sand out of the road so as to permit of passage of the truck to the point where the material was to be unloaded. The driver estimated that it would have taken three hours to make the trip with a pair of horses.

The trucks operate over a radius of approximately 20 miles in hauling from the West saw mills during the logging season, a distance not practical with horses. The trucks average two round trips the day on the maximum haul or about 40 miles. Road conditions and loading do not favor the third trip. One of the hauls the trucks have made is from a tract at Durham, 12 miles distant from Auburn. After a rain the road is in fair shape, but during the dry season it is well cut up by the wheels. The average load is 2500 ft. and the trucks make three round trips each or about 72 miles the day. Much delivery of lumber and building material is made by the trucks to Sabbatus, a town eight miles from Auburn, and three round trips a day are easily accomplished.

Statement is made that the trucks have effected a saving over the conventional methods of transportation of $1 the 1000 ft. of lumber hauled from the timber tracts, and that in some instances there has been a greater saving. One in particular was the bringing out of quite a quantity from a certain tract located from three and one-half miles to the nearest railroad siding and about 10 miles from the point of destination. The cost of hauling by horses would have been $4.50 per thousand in addition to the time factor. A comparison of costs by steam and electric roads with the trucks as made by Mr. West showed a considerable saving over these. In 1918 Mr. West had a contract for 10,000,000 ft. of lumber for a certain munition company and it was promptly filled, thanks to the trucks. And if the machines effected a saving of $1 the thousand in this case, it was good economy to utilize trucks.

Saves Repeated Handling

Later when the writer was at Portland, Me., he met one of the West trucks at the plant of a contractor where a large boiler and its equipment was being unloaded. The driver stated that he had made the run from New Brunswick, a distance of 36 miles, with the bulky and heavy load in five hours. It was an emergency haul, as the contractor required the equipment and could not afford the delays contingent upon the use of the common carriers. The use of the truck saved two handlings, both expensive, when the character of the material is considered. The instance is cited to show the versatility of the trucks. Trucking of general character is practiced, which fills out the idle time and makes possible a profitable use of the equipment.

Mr. West keeps an accurate record of the costs of the trucks and states he charges insurance, interest on investment, depreciation, repairs, driver, oil, grease, fuel, tires, etc., and that he can operate the units at $15 the day. There is no garage charge the greater part of the year, as the drivers store the machines on their premises. The bulk of the repairs are made by the drivers, one of which is a good mechanic.

The new truck has been in service approximately a year and the driver informed the writer that the repairs made were taking up on one connecting rod and relining the brakes. Good brakes are required in the territory in which these trucks operate, as many short, steep hills abound. The drivers go over the trucks very thoroughly once a week and the points requiring lubricating are lubricated. The drivers are paid good wages with good overtime allowance and are faithful to the interests of their employer. Both believe in the use of the governor with which each machine is fitted and the older driver said it is not tampered with and that he had never stalled his engine on the worst of grades.

The moral of the story is that the idle time can be turned into a profit for the owner of trucks if he will exploit the field in which he is operating and employs drivers who will co-operate with him and not work by the clock. The thought occurs that if dealers would give a little more consideration to the prospect's business after selling the truck, show the owner where he could turn the idle time into profitable time, there would be more trucks sold to these concerns who have a habit of carefully estimating costs of transportation and who prove hard prospects for the average truck salesmen.

When the Farmer Ordered His Building Material He Specified Delivery on the Same Day. The Truck Made The Round Trip in One Hour. It Would Have Taken a Pair of Horses Over Double the Time Owing to the Poor Roads and Steep Hills.

Unique Sales Contest

WABASH, IND., Sept. 19.—A very unusual sales contest is being carried on by the Service Motor Truck Co. The contest covers the last six months of this year and offers as a reward to the victorious one a Curtiss J. N. Type airplane and a complete course of instruction in flying at the service aviation field. The contest has been so arranged that no matter where a dealer is located nor how small his territory he has an equal chance to win. Standings are announced each month in the sales bulletin.

Lubrications of the Motor Car Chassis is the title of a chart by Victor W. Pagé. This chart gives a plan view of a typical six cylinder automobile chassis with all the important points requiring lubrication clearly outlined. Each point to be frequency of applications. The directions under the illustration explain in detail all that is to be done at each spot. W. Henley Publishing Co., 2 West 45th The chart may be had from the Norman St., New York City. The cost is 35c.

Harrison H. Boyce, of the Moto-Meter Co., Inc., is now sole owner of the fundamental Erwin patent, which is recognized in the fire extinguisher field as basically covering automatic means of extinguishing fires under the engine hood of passenger cars, trucks and tractors. It is claimed that the new fire extinguisher will have many advantages over those already on the market. It will sell at a popular price.

Brooklyn Motor Truck Parade Huge Success

BROOKLYN, N. Y., Oct. 13.—Brooklyn's "Ship by Truck" industrial parade, fostered as an educational movement by the truck dealers of this city, was a huge success. It went over big because the truck dealers' association worked hard, and the movement to educate the public to motor highway transportation received excellent support from the press. Days previous to the event, which took place on Columbus Day, the city was billed with large and attractive posters calling attention to the industrial exposition on wheels. As a result the long line of the route taken by the trucks was thronged with people. There was plenty of music, and quite a number of bands were transported in trucks.

This Truck, Advocating "Ship by Truck" Transportation Carried a Live Goat—the Railroad's "Goat"

Miles of Trucks

Estimates vary as to the number of machines participating in the 22-mile parade. A member of the committee stated that there were twenty-five miles of cars, while another estimated that there were over 3000 trucks in line. Nevertheless, it was a big parade and a most successful one, and the public was afforded an opportunity to note the various uses to which the motor truck is

There were several divisions, the first being composed of trucks employed in various industries, and to enumerate them would be to list the "butcher, the baker and candlestick maker." There were, however, a fine representation of manufacturers employing fleets of trucks and the sight of forty or more trucks bearing the name of a concern was impressive. As one bystander remarked: "I did not know that company did such a big business." There were several large fleets of thirty or more trucks and among these were several of companies engaged in general transportation. One haulage company had thirty-two 5-ton Pierce-Arrows, and all were equipped with van bodies. They looked exactly alike and could only be distinguished by the numbers. All were spick and span, as were the majority of the machines.

The dealers' division proved interesting, as many displayed considerable ingenuity in the matter of publicity and decorations. One that made a distinct hit was a Reo Speed Wagon. This was equipped with a platform type of body and was decorated to represent an agricultural scene. There was the straw, etc., and a group of "rubes," with their red faces and wide brimmed straw hats. These played string instruments and received greetings from the spectators.

When it comes to propaganda the display of the Republic dealer was in a class by itself. The leading chassis carried a large sign listing the models and prices. Closely following was another chassis with an acrostic sign as follows:

ALL THAT THE NAME IMPLIES

Reliability
Endurance
Pleasure to work with
Universally used
Best buy
Long life
Increased income
Cost quickly earned

Following this chassis was a tractor and trailer carrying a pair of horses. The sign on the trailer was appropriate and was as follows:

HORSE SENSE

We Have Lost Our Bull In Brooklyn Because This REPUBLIC TRACTOR & Trailer Hauls 4 Times As Much Per Day As We Can At Half The Cost and Never Lays Down

The Selden dealer had a very interesting exhibit mounted on a Selden chassis. It was the old Selden gasoline vehicle said to have been constructed in 1877. This old timer had a Selden salesman at the wheel, and the exhibit afforded the spectators an opportunity to note the progress made in motor vehicle construction since the days of the famous Selden patent litigation.

Has Railroad's "Goat"

Another dealer mounted a complete chassis on a large capacity truck, while still another showed a power plant complete with hood dash and steering gear. The Service truck made use of its name by displaying a large sign, "Service Does It." Another novel display was the carrying of a goat on the driver's seat. This transportation company was not backward in displaying a sign stating "We Got the Railroad's Goat."

The parade demonstrated that pneumatics are increasing in use and are not being confined to one and two-ton trucks, for a number of large capacity cars were equipped with the big shoes. Tire manufacturers were represented, and the Firestone float carried a Pershing cannon that shot bombs of literature by means of compressed air. Many of the trucks were elaborately decorated and no little ingenuity was shown. There was an accessory division, in which tires were largely represented. Service was

Another View, Showing the Crowds That Lined the Streets. Note the Acrostic Sign Carried by the Foremost Truck

shown, a magneto concern having a service department on a truck.

The success of the parade is due to the efforts of the executive committee, which was as follows: A. S. Rampell, chairman; R. W. Sykes, Jr., secretary; W. R. Couch, treasurer; C. B. Fox, director of publicity and advertising; M. Ray Stehley, R. S. Locke, Alfred Duerr, Charles Churchill, Joseph Freeman, F. J. Dose, D. Corey Adams, W. E. Schepp, N. R. Roberts, W. T. Tocker, E. T. O'Loughlin, A. H. Smith and Philip T. Farley. No little credit is due C. B. Fox, of the Brooklyn Eagle, who directed the publicity which was instrumental in making the truck parade the success that it was. There is every reason to believe that it will be repeated in another year.

Commodious Omnibus Has Seating Capacity of Thirty Passengers

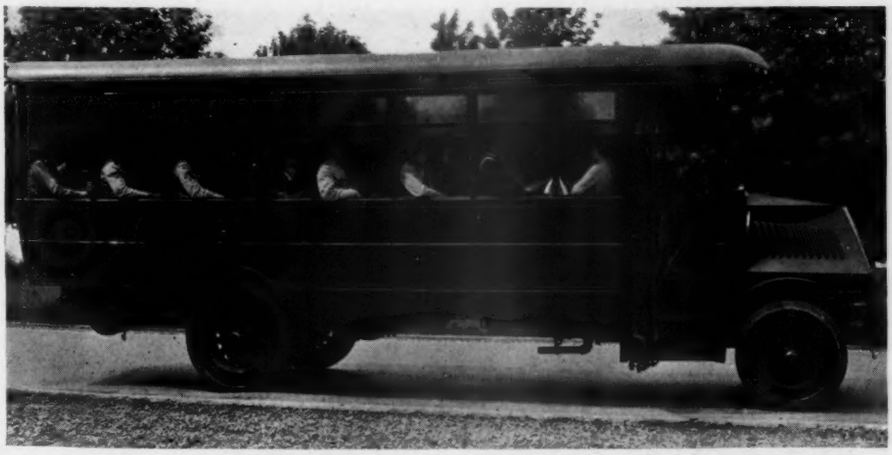
PEOPLE clamor to ride in a bus when it is furnished as elaborately as this one owned by Wm. H. Merz, of Philadelphia, Pa., and mounted on a Mack 3½-ton chassis. This bus has a seating capacity of 30 passengers, the chassis having a 16-ft. wheelbase and special length of frame. The body is 21 ft. 7¼ in. long from the dash to the rear; is 7 ft. 6 in. wide, and measures 6 ft. 8 in. from the floor over the roof.

Heat in cold weather is furnished from the exhaust of the motor through pipes running along the floor on either side of the body and covered by metal grill. The vehicle is lighted by dome lights in the ceiling which are fed from the generating and storage battery with which the bus is equipped.

To make this limousine illusion more perfect, silk faced pantasote roll curtains and interior draperies have been added to the equipment. Removable window guards may be attached in stormy weather, running the entire length of the body outside the windows.

Sewell wheels have been used for softer riding. Entrance and exit are made via the folding door operated by the driver. In case of emergency, there is an exit in the rear. This bus in addition to its regular duties serves as a funeral bus, which change can be effected merely by replacing the draperies.

This is an Interior View of a Bus, Not a Pullman Car



Elaborate Bus Owned by Philadelphian. It is Mounted on a Mack Three and a Half Ton Chassis and Runs on Sewell Wheels

Service Managers' Meeting Well Attended

NEW YORK, Oct. 8.—What is service? This subject provided a very interesting discussion among the members of the Automotive Service Association of New York at its monthly meeting last evening at the National Automobile Chamber of Commerce. A number of papers had been prepared upon invitation by the program committee and these were read by the writer and the secretary for those not present.

Various opinions prevailed as to the definition of the word service, some holding that there should be no free service, that all repairs, adjustments should be paid for, that the service department was entitled to a fair profit. Others held that a certain amount of free service should be given, that it was essential and a factor in the sales policy.

The many problems of the service department were discussed and it appeared to be the concensus of opinion that some definition should be arrived at, but at a late hour the members had not reached a decision, so it was decided to hold a special meeting on Tuesday evening, Oct. 14, at which an effort will be made to solve the problem.

There was a very large attendance and interest was keen throughout the discussions. And a number of applications for membership were acted upon. The majority of the service managers present represented the passenger car industry and it was natural that the service problem was viewed from their standpoint. While service may be said to be service, and a sound policy is applicable both to passenger cars and trucks, that practical with the commercial car may be said to differ in several respects, notably that the owner's trucks must be kept on the road regardless of shop hours, etc. Those interested in trucks were somewhat disappointed not to hear more of truck service policies. Two representatives of this industry gave their definition of the word service which was conventional.

It is hoped by those having the best interests of the truck at heart that an opportunity will be afforded the truck service managers to present their ideas of what is service. It is true that the discussion was an open one and members were invited to contribute papers, but one truck representative said after the meeting that he hoped a sufficient number of the service managers of the truck dealers would attend some meeting where they could have a real, old-fashioned discussion of truck service.

The next monthly meeting of the association will be held November 7 and the subject for discussion will be "Selling Service." President Rawson, of the Automotive Service Association of Newark, stated that Newark organized last week and had practically adopted the constitution and by-laws of the New York association. He extended an invitation to the New York members to

First Transcontinental Army Convoy Shows Ability of Modern Trucks

THEY said it couldn't be done, but here we are," is the motto of the Corps of Engineers, U. S. Army, and the trucks as well as the men of that organization have earned the reputation of making good their motto. When the Motor Transport Corps staged the first Transcontinental Motor Train, the engineers were called upon to provide a detachment to take the lead, strengthening bridges, removing rocks and otherwise sizing up and clearing the way for the main train. An infantry officer, Lieut. Col. McClure, a veteran of the European War, was put in command of the entire unit.

Through Navada the Roads Were Usually Narrow and Strewn With Boulders. The Rocks Along Each Edge of the Road Sometimes Pressed the Front Tires Inward as Much as Two Inches. At Night They Had to be Pushed Back With Sledges and Bars.

The train was composed of an assortment of vehicles, those in the M. T. C. convoy being made up of standardized Liberty 3-tonners, three 4-ton Rikers, two 1½-ton Packards, two 1½-ton Whites, two 1½-ton Garfords, two F. W. D.'s, an Ordnance four-wheel-driven tractor, a G. M. C. ambulance and Cadillac, Dodge and White touring cars. The engineer detachment was separately organized, having five Mack AC 5½-ton chassis, the heaviest vehicles in the train. There were seventy-two vehicles in the train.

The train started on schedule from Washington, D. C., July 7, 1919. It was planned to make the trip by easy stages, reaching the Presidio at San Francisco, September 1. The primary purpose of the trip was to recruit men for the Motor Transport Corps, but incidentally it was a test of the trucks and an experiment in long-distance convoy work under American road conditions. A total of six days' time was lost en route, mostly at the western end of the journey. The trip ended Saturday, September 6.

Throughout the run the engineer detachment from the Fifth Engineer Regiment, U. S. Army, led the train, setting the pace on good roads and breaking the trail on poor ones. Each Mack, in addition to a heavy load, was being subjected to the extra duty of breaking a wide track for the broad-gaged trucks, wherever dirt roads, rutted to the narrow tread of touring cars and horse vehicles, were encountered.

By odometer, the total mileage covered by the train was 3425 in 56 days of actual running—an average of 61 1-6 miles per day. The maximum mileage in one day was 87 miles. The route followed was the Lincoln Highway as far as possible, though occasional detours, and an important one to Ogden, Utah, were made. From Washington to Omaha and from the California line the roads were generally good, but between these stretches they were in a deplorable condition.

Some of the Ohio Roads Were Fairly Good, But the Good Going Really Ended When Pennsylvania Was Crossed

In addition to the trucks and touring cars there were several auxiliaries. There was a standard Ordnance Caterpillar tractor for use should the trucks become hopelessly mired, which was carried throughout the trip on one of the 5½-ton Macks. The weight of the tractor and the truck which carried it totaled 24,480 lb., the heaviest vehicle in the train. There were several solo and side-car motorcycles for the use of dispatch riders and orderlies. There was a Cadillac searchlight outfit, too, to provide illumination for possible night work on bridges or roads and demonstrations at night stops. Then there was a standard engineer pontoon, carried on a four-wheeled trailer, for use should it be necessary to improvise a bridge.

The motorcycles proved very useful so long as good roads prevailed, but when the difficult going in the desert and mountain states was encountered, these had to be loaded on the trucks. The pontoon was towed by one of the Mack trucks from Washington to Omaha, Neb., where it was left because its length, some 30 ft., was too great to negotiate the tortuous turns to be encountered in the mountain passes.

Three of the Macks were cargo trucks, carrying supplies, planks, steel girders, hammers, tools, nails and other road and bridge construction materials, and one of them the Caterpillar. A fourth was a machine shop truck, equipped with a complete set of machine tools, such as lathe, drill press, grinder, etc., driven electrically by a 5-k.w. electric generating set driven by an independent engine. The fifth truck was a blacksmith shop, complete with a forge, anvils, welding outfit and other metal working equipment. All of these were the standard vehicles of the Corps of Engineers, developed during the war for use overseas on the standard Mack engineer chassis.

As is army custom, the Engineer detachment was quite separate from the Motor Transport Corps detachment, the

The Tractor Was Rolled Off the Mack, the Latter Was Jacked Up and Stout Planks Placed Beneath Its Wheels and It Was Run Forward to Safety

former being under the command of Capt. A. E. Ritchie and the latter under Capt. McMahon. The Motor Transport convoy had forty mechanics attached to it for the care of their trucks. The Engineer trucks, however, were not provided with any mechanics beside drivers.

Only once was the tractor forced to proceed under its own power. Excepting for an 11-mile grade between Carson City, Nevada and Lake Tahoe, Cal., it was hauled every mile of the way by a Mack cargo truck.

As leaders of the train, it fell to the lot of the Macks to break most of the bridges that could not sustain the weight of modern traffic. As they were the largest and most heavily loaded of all the vehicles, what they could cross the others were safe in traversing.

In most cases a superficial examination of the bridges could not serve to show their strength, so that weak bridges were located when the Macks broke through. In no cases was damage of a serious nature sustained by these mishaps, however, the trucks being able to come away under their own power in most cases, after which the bridge would be repaired by the engineers for the safe passage of the rest of the train.

On one day sixteen bridges and thirty-one culverts were broken between Green River and Fort Bridger, Wyo. Three of these were broken by the leading Mack, with the tractor, which was the heaviest vehicle in the train. In most cases, however, it would make the passage safely, but in going over would so weaken it that it would give way under the repeated shock of one of the following trucks. In some cases where the bridges were plainly inadequate the trucks detoured through gullies, fording swollen streams and climbing steep banks.

Itinerary of First Transcontinental Motor Convoy, Motor Transport Corps and Corps of Engineers, U. S. Army

Control Point.	Arrival Date. 1919
Washington, D. C., starting point,	Monday, July 7
Frederick, Md.	Tuesday, July 8
Chambersburg, Pa. (via Gettysburg, Pa.),	Wednesday, July 9
Bedford, Pa.	Thursday, July 10
Greensburg, Pa.	Friday, July 11
East Palestine, O.	Saturday, July 12
Rest period	Sunday, July 13
Wooster, O.	Monday, July 14
Bucyrus, O.	Tuesday, July 15
Delphos, O. (detour on new road),	Wednesday, July 16
Ft. Wayne, Ind.	Thursday, July 17
South Bend, Ind.	Friday, July 18
Chicago Heights, Ill.	Saturday, July 19
Rest period	Sunday, July 20
DeKalb, Ill.	Monday, July 21
Clinton, Ia.	Tuesday, July 22
Cedar Rapids, Ia.	Wednesday, July 23
Marshalltown, Ia.	Thursday, July 24
Jefferson, Ia.	Friday, July 25
Dennison, Ia.	Saturday, July 26
Rest period	Sunday, July 27
Council Bluffs, Ia.	Monday, July 28
Omaha, Neb.	Tuesday, July 29
Columbus, Neb.	Wednesday, July 30
Grand Island, Neb.	Thursday, July 31
Lexington, Neb.	Friday, Aug. 1
North Platte, Neb.	Sunday, Aug. 3
Ogallala, Neb.	Wednesday, Aug. 6
Big Springs, Neb.	Thursday, Aug. 7
Kimball, Neb.	Friday, Aug. 8
Cheyenne, Wyo.	Saturday, Aug. 9
Laramie, Wyo.	Sunday, Aug. 10
Medicine Bow, Wyo.	Monday, Aug. 11
Rawlins, Wyo.	Tuesday, Aug. 12
Tipton Station, Wyo.	Wednesday, Aug. 13
Green River, Wyo.	Thursday, Aug. 14
Fort Bridger, Wyo.	Friday, Aug. 15
Evanston, Wyo.	Saturday, Aug. 16
Echo City, Utah	Sunday, Aug. 17
Ogden, Utah	Monday, Aug. 18
Salt Lake City, Utah	Tuesday, Aug. 19
Orr's Ranch, Utah	Wednesday, Aug. 20
Gold Hill, Utah	Thursday, Aug. 21
Rest period	Friday, Aug. 22
Sheridan's Ranch, Ibapan, Nev.,	Saturday, Aug. 23
Ely, Nev.	Sunday, Aug. 24
Eureka, Nev.	Tuesday, Aug. 26
Austin, Nev.	Wednesday, Aug. 27
Westgate, Nev.	Thursday, Aug. 28
Fallon, Nev.	Friday, Aug. 29
Carson, Nev. (detour on new road),	Saturday, Aug. 30
Rest period	Sunday, Aug. 31
Myers, Cal.	Monday, Sep. 1
Placerville, Cal.	Tuesday, Sep. 2
Sacramento, Cal.	Wednesday, Sep. 3
Stockton, Cal.	Thursday, Sep. 4
Oakland, Cal.	Friday, Sep. 5
San Francisco, Cal.	Saturday, Sep. 6

Goodyear Tire & Rubber Co., Akron, O., announces that it is offering straight side rims with the Goodyear Locking ring feature in all sizes up to 44 x 10. The truck sizes are 36 x 6, 38 x 7, 40 x 8, and 44 x 10.

A Noon Stop for Lunch in One of the Many Prosperous Towns in Iowa, Where the Troops Were Hospitably Received

The American Bosch Magneto Corp., Springfield, Mass., has recently opened 58 new service stations. Each of these stations has, besides a very complete assortment of Bosch products and genuine service parts, a laboratory which is well equipped with special tools and testing apparatus. Bosch service representatives are very carefully chosen and receive their appointment only after the most rigid examination and investigation on the part of the Bosch representatives have proven them to be sufficiently intelligent and capable of representing the Bosch interest in their fields.

Keystone Tire & Rubber Co., New York City, now has 160 stores in its chain of stores which are doing business in all sections of the United States. Each store is incorporated with its own officers and conducts its business independently of the home company. At the same time it has the backing of the parent organization, which has special facilities and contracts with tire manufacturers to market their surplus stocks and over production of tires and tubes.

Service and Accessories Sell Trucks

By H. R. BRATE

THERE was a certain young man—as the saying goes, but this certain young man, instead of going down from Jerusalem to Jericho, went down from Danville, Ill., to Decatur of that same state. Instead of falling among the thieves and robbers he fell into the truck business, and so our story begins.

There is a great difference in a fall. Some fall down completely, others just naturally drop, while there is still another class who fall so hard they are sold, and if the kind of dope they happen to fall in is the truck business—why, that is their business from henceforth and ever. That was the kind of fall H. M. Haskell, manager of the Decatur Republic Motor Co., took three years ago.

I happened to drop in on this gentleman just as a customer was signing up a truck order, which was the ninth in ten days, and which is going some, as truck orders are handed around nowadays—especially so when he does all of the selling himself. He has sold himself so completely on trucks that he is selling everybody who has use for a truck, his particular brand and breed. In fact, it was confidentially whispered around that he had so sold the farmers around that neck of the woods that they were figuring on raising a crop of trucklets. Of course, that is only hearsay, and I am passing it on for what it is worth.

Mr. Haskell attributes his success in handling trucks to two things: The handling of truck accessories and service, mixed in, of course, with considerable hustle.

"Three years ago," said Mr. Haskell, "when I came here and took up the sale of trucks there were just nine trucks of the make I am handling in this territory, and no service. The first thing I did was to hire two good service men and equip a service station. I then saw the owners of those nine trucks and told them to bring their trucks in and we would overhaul without a cent of cost. They looked dumb-founded—to think that they were really going to get some service on their machines. They brought them in and we fixed them up, and placed them in first-class condition. That made a hit right at the start, and business started to come.

"We have been strong on the service, and no man, no matter what the trouble is, is without a truck more than a couple of hours. If my men find that the trouble is something that will take several hours, half a day, or longer to repair, we immediately loan him another truck. We keep a truck for just such emergencies, and I am telling you that makes a hit. We carry a good stock of repair parts—some $14,000 worth, right in the bins in our stock room, so we don't have to keep our emergency truck away very long.

"I wasn't here very long before I learned that the truck owners, who had other makes, were experiencing difficulty in getting work done on their machines, so we decided to help them out. This has resulted in a great many cases of selling them one of my trucks when they added to their fleet. I have found that it doesn't pay to be stingy with your service—it is a great asset and brings home the bacon."

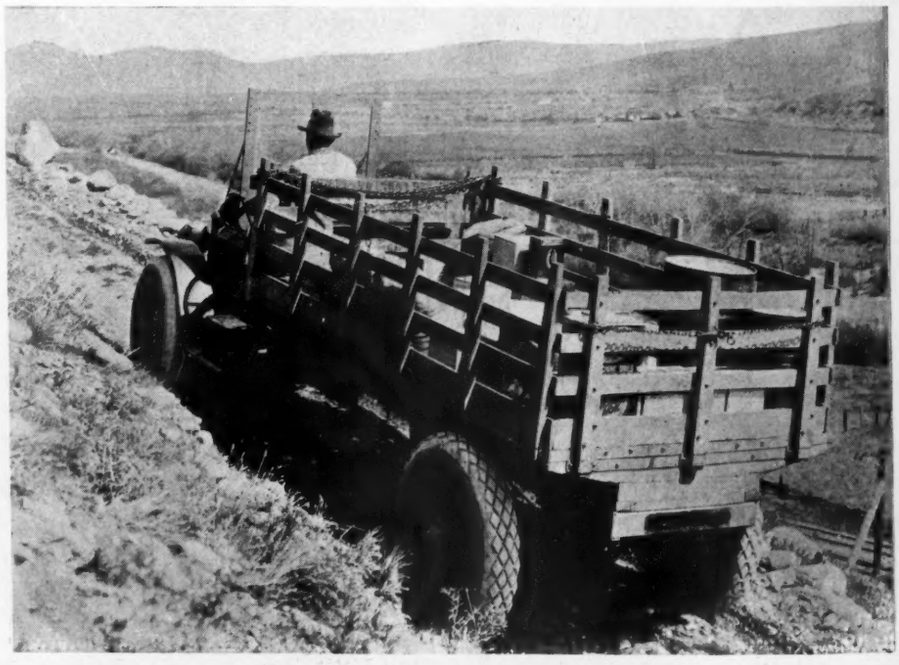
"Do you handle truck accessories?" I asked.

"You bet we do," he replied. "Why! the selling of truck accessories is one of the greatest drawing cards I have outside of the service we give. We handle truck accessories of every description and not only for the make of truck we handle, but for every make of truck used in this city. We handle truck tires and are equipped to put solid tires on such trucks as are so equipped. We find now, however, that our business is about equally divided between the solid and pneumatics—it all depending upon the work the truck is to do, but pneumatics every time for the farmers.

"I'll tell you what the accessory business does for us. We go strong on the service and accessories as I have just said, the idea being that it gets the fellows who own other makes, coming into our place, and I absolutely know that selling accessories has sold trucks to those owners of other makes that we could not have gotten in any other way. The dealer who does not handle truck accessories is making the mistake of his life, for it not only means that he is losing a nice profit on those accessories, but is losing a chance to sell trucks as I am doing. At the present time we are selling accessories and giving service to some three hundred and fifty trucks which means quite a nice business in the course of twelve months.

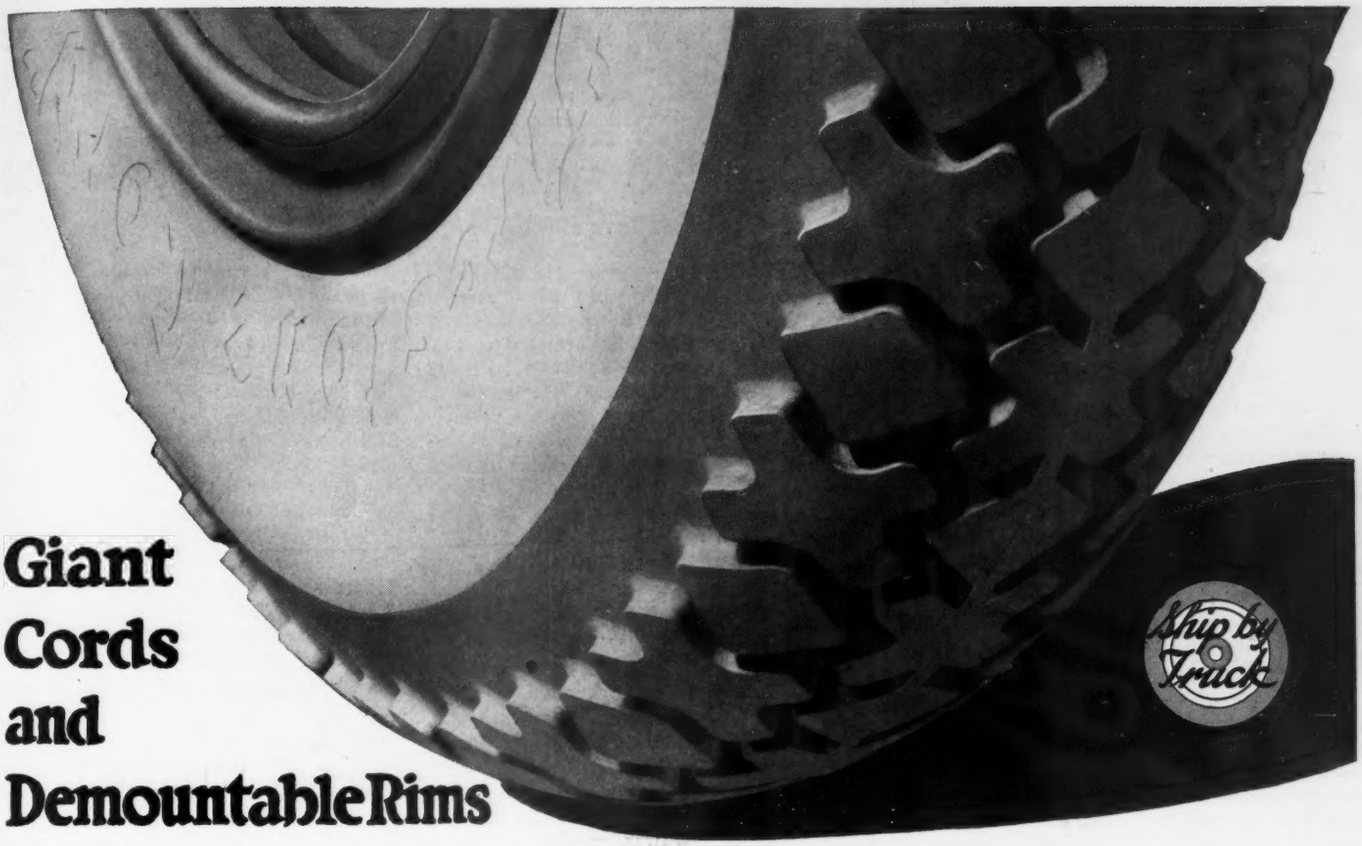
"When I sell a man a truck I analyze the particular work he expects that truck to do, and I sell him, if those conditions seem to warrant, a little larger truck than he first had in mind. You see in a great many kinds of work they are very apt to overload, and that is the reason the truck does not stand up as it should. A larger truck not only lessens service but gives him better satisfaction all around."

Mr. Haskell's sales record isn't so bad. The first year he sold eighty-nine trucks, the second, sixty-nine, while this year up to the first of October he had sold sixty. There must be something in this service and handling accessories after all.



Transporting Freight Over Mountains by Truck

A franchise to operate a truck in freight transportation work from Reno to Gardnerville, Nevada, was granted L. J. Ginocchio about four years ago. A two-ton Federal was put to work and within a few months Ginocchio's brother joined him with another Federal. One round trip was made each day, traveling 104 miles in less than seven hours. The trucks cover mountainous roads leading into California, and the work is a severe test for the efficiency of the motor truck and pneumatic tires, Goodyear cord pneumatics being used on one truck, on such hauls. In one week one truck on solid tires hauled 20.2 tons, traveled 728 miles at a cost, including all items, of $105. The revenue was $161 at $8 per ton, leaving a profit of $56. The pneumatics have enabled the trucks to do more business in less time and with quite a saving in gasoline and other costs.



Giant Cords and Demountable Rims

Reasons why—Over half the truck tonnage of America is carried on Firestone Tires

THE Firestone Giant Cord Truck Tire has contributed safety and economy to trucking while making higher speed possible. More strength, more air space, greater traction surfaces, extra heavy non-skid tread—these things are giving a greater measure of mileage service to all Firestone users.

And Firestone engineers have perfected the Demountable Rim that holds these Giant Cords to the wheel.

This saves much time on the road, permitting quick and easy tire changes while preserving great strength with minimum weight.

Firestone

Most Miles per Dollar

LEGAL DEPARTMENT

Limiting Loads on City Streets

In the recent case of Froehlich vs. City of Cleveland, 124 Northwestern Reporter, 212, the Ohio Supreme Court, one judge dissenting, upheld the validity of the following section of the defendant city's ordinances:

"No load in excess of ten tons in weight, including the weight of the vehicle, shall be propelled or driven upon or over the streets of the city, provided, however, that the director of public service may issue permits in special cases for the carrying of heavier loads upon or over certain streets especially designated in the permit."

The principal ground of attack made against the ordinance was a claim that the regulation conflicts with a state law fixing twelve tons as a maximum load to be moved along improved public streets, highways, bridges, etc., with certain exceptions. But, after an extended discussion of municipal powers, existing under the peculiar provisions of the Ohio constitution, a majority of the members of the court concludes that it was within the discretion of the legislative authorities of Cleveland to fix ten tons as a maximum load to be hauled over the city's streets, excepting as special permits might be issued. The opinion says, in part:

"And there is no language in the home rule amendment which indicates that it was ever intended that the right of the city under that amendment to exercise the governmental control of the streets should end when it had located and surveyed the street, prescribed its width and grade, excavated it and put in the broken stone and concrete, laid the brick, stone or asphalt upon it, paid for all of these things out of the municipal treasury, and assumed full responsibility for keeping the street open, in repair, and free from nuisance, and that thereafter this domestic, municipal and local concern should be subject to the uninformed supervision of foreign authority. It is a necessary incident of the governmental power of the city to do the things above stated in the construction and control of the streets to make such reasonable provisions for their proper and economic use as its close knowledge of the necessities of the situation and the structure of the streets themselves demonstrates to be proper. Knowledge of its own conditions might lead a city to construct streets of such heavy material and in such manner in the manufacturing and wholesale sections as to make proper the passage over them of loads heavier than 12 tons, and thus to assist in the advancement of commercial and industrial enterprises."

Mr. Justice Jones, dissenting from the conclusion reached by his associates, adopted the view that the provisions of the ordinance, limiting loads to ten tons, is in conflict with the state law, prescribing a limit of twelve tons, within the meaning of a constitutional provision, that municipalities may adopt local police regulations "not in conflict with general laws."

Graduating Licenses

An ordinance or state law fixing license fees against motor vehicles on bases of power is constitutional, holds Colorado Supreme Court in the case of People vs. Ard, 182 Pacific Reporter, 892.

Defendant was convicted of violating the Colorado laws by having operated a motor vehicle without having registered it with the Secretary of State. Appealing to the Supreme Court, he contended that the law was invalid, as infringing a constitutional requirement for uniformity of taxation of property according to valuation. But the court holds that license fees imposed against the operation of motor vehicles is to be regarded not as taxation in the ordinary sense of that term, but in the light of payment for the privilege of using streets and highways and compensation for damages done to them through the driving over them of machines.

The law provides for a license fee of $2.50 on motor vehicles up to and including 20 hp., $5 on vehicles of from 21 to 40 hp., and $10 on vehicles of higher power.

Scope Bonds Limited

A statute in New Jersey requires the owner of a jitney bus to file with the municipality, within whose borders he operates, a policy of insurance indemnifying against liability "for damages on account of bodily injury or death suffered by any person or persons as a result of an accident occurring by reason of the ownership, maintenance or use of such autobus upon the public streets of such city. * * * Such insurance policy shall provide for the payment of any final judgment recovered by any person on account of the ownership, maintenance and use of such autobus or any fault in respect thereto and shall be for the benefit of every person suffering loss, damage, or injury as aforesaid."

Interpreting this statute in the case of Gillard vs. Manufacturers' Casualty Insurance Co., 107 Atlantic Reporter, 448, the New Jersey Court of Errors and Appeals holds that one who suffers loss from an injury to his automobile, resulting from collision with a jitney bus, cannot recover such loss from the indemnifying insurance company. The court holds that the language of the statute must be interpreted as to limiting the liability of the insurance company to accidents resulting not only from fault of the autobus operator, but also resulting in **bodily injury or death.** Of course, one whose automobile has been damaged through negligent operation of an autobus has a valid claim against the autobus owner or operator. But he has no valid claim against the insurance company issuing one of the statutory policies.

Conflicting Chattel Mortgages

The law is such that where a motor vehicle is mortgaged ordinary repairs afterwards made on the car by the owner operate to the benefit of the mortgagee. The materials used in making the repairs become parts of the property subject to the mortgage. But a late decision of the Alabama Court of Appeals shows that a readily detachable attachment may be subject to different mortgages or ownership. (Dothan Foundry & Machine Co. vs. Hallman, 82 Southern Reporter, 642.)

Defendant held a mortgage on a Ford runabout, the same having been given before the owner bought a "form-a-truck" attachment. When the attachment was bought from plaintiff the owner of the car gave a mortgage back to secure payment of the price, the mortgage purporting to cover both the car and the attachment.

Defendant secured possession of the car and attachment on his mortgage becoming past due, and plaintiff sued to recover possession of the attachment under its mortgage. Affirming judgment in plaintiff's favor, the Court of Appeals notes that the attachment could be readily unbolted and removed from the chassis to which it had been attached, and that it did not lose its separate identity by being installed on the automobile. The court says:

"The law of accession [the legal principle under which property may lose its identity by being merged into other property] is not altogether clear, but this much may be said to be reasonably certain: When property can be easily distinguished and separated, no change of property takes place, provided the separation can be made without injury to the thing attached."

Rise in Railroad Freight Rates Will Benefit Motor Truck Transportation Companies

What the Dealer Can do to Eliminate Failures Among Motor Trucking Concerns. Efficient Routing Necessary

ESTABLISHED and successful operators of fleets of trucks engaged in general transportation are anticipating the conditions that may exist when the problems confronting the common carriers, steam and electric, are solved. Those having made an intensive study of transportation state that the increased cost of material and labor means a substantial increase in the freight tariffs of the railroads. Statement is also made that the electric lines, which in many instances act as feeders to the steam roads, are operating at a loss. In some instances service has been discontinued. Roads operating under receivers are not uncommon.

Truck Replacing Railroads

There is no denying the fact that the motor truck is making great inroads in the business of the common carriers, particularly the short haul. The writer has talked with numerous agents of the freight stations in small cities and in towns and the majority say that both the freight and express business is falling off and has for some time. The motor truck is held responsible. Claim is made that any advance in rates by the common carriers will see a greater increase in the use of trucks and that with the service closely approaching that of the railroads insofar as schedule is concerned, many industries will desert the common carriers for motor highway transportation.

The ship-by-truck movement would have gained many more adherents than it has were it not for that class of irresponsible operators called the "gyp" by the trade. They operate as a rule without insurance other than that required to cover the dealer's investment in the truck, which does not afford the shipper protection against loss. Offering attractive rates which are below operating costs, the "gyp" has, through questionable and unbusinesslike methods, made an unfavorable impression on shippers. It may be argued that shippers will not intrust valuable goods to a truck operator until assured as to the reliability of the latter. This is true, but does not, as a rule, apply to general commodities. These conditions have been responsible for the failure of more than one trucking company starting on a legitimate basis.

This article is not intended to be a diatribe on the shortcomings of certain truck operators, but it is fitting to mention the dealer's responsibility. Too many dealers in their anxiety to sell trucks are too optimistic as to the possibilities with a single truck and limited capital. Encouraging a prospect with a few hundred dollars and no knowledge of transportation or costs of truck operation to engage in general trucking or motor highway transportation is unsound merchandising of trucks.

A great many trucks sold in this manner will either, if the prospect was successful, result in a re-sale for the dealer or, the owner in order to meet his payments, will, through unsuccessful endeavor, cut prices, commonly known as "gyping." This should be avoided, the truck should not be "sold" under these conditions. The cost of the final disposition of trucks sold under such unsound business ethics will positively result in cut into the business of this truck owner who retaliated by cutting. The result was the dealer had two trucks in poor condition on his hands, plus a double loss, the former repair bill and another bill to be incurred by placing the trucks in a salable condition.

One of the Several Ten-Ton Tanks Being Hauled From Providence, Rhode Island to Fall River, Massachusetts

Note the use of jacks to save the springs while the driver is at lunch

How the Salesmen Err

"But," said a dealer with whom the writer discussed a similar incident, "it is not up to me to run the business of my customers. I sell the truck, give service, and that ends it as far as I am concerned. Every one cannot make a success of his ventures and so it is in the transportation line." Yet this same dealer had truck come-backs that did not stay sold and his salesman admitted that in practically every instance the prospect "bought a truck." The prospect was not given any advice as to how to conduct a motor highway transportation business. Neither was he told of the evils resulting from price cutting nor was he accurately informed as to operating costs. The prospect was supplied with operating costs, but in going over these the writer found that they were decidedly optimistic. These cost figures were "supplied" to the dealer, who never took the trouble to check them or take into consideration that running conditions, under which trucks operate, vary radically in different localities.

After a thorough investigation of the possibilities of motor highway transportation, covering substitution of individual owned trucks for the short hauls, the writer has come to the conclusion that the bulk of the business will eventually fall to the operators of large fleets of trucks for many reasons apparent to students of transportation. These concerns may not begin with over two or three trucks, but if their methods are sound they will add to their fleet as their business expands. To sell companies their first trucks will require a transportation salesman, not an order taker. It matters not if the trucks are to be used in general transportation, for its requirements must be carefully analyzed and the cost figures supplied must be accurate, not the glittering generalities indulged in by the order taker type of truck salesman. There must be real service.

One exceptionally successful truck dealer contends that more attention should be given to the prospect making small profits. Yet too many dealers indulge in this practice and if not directly they allow their salesman to do so, which amounts to the same thing.

Trucks Come Back

A concrete example illustrates the point. A dealer in a New England city sold two trucks on the partial payment or lease plan. A small initial payment was made and notes taken for the balance in the conventional manner. The first few payments were made, then it happened. Accidents and misuse of the trucks, which were repaired by the dealer, ran up a big bill which the truck owner could not meet, as he had a note coming due. Competition by a "gyp"

his initial investment in a truck than the owner of several. This dealer includes in his service policy an oversight of the use of the first truck. In other words, he follows up the truck, notes the work of the driver, watches the reports made by the inspectors, checks up cost figures, loading, routing, etc. And this work is not always turned over to a subordinate. The policy of this dealer is sound. He is building for repeat orders. This dealer is willing to spend the profits of the initial sale in directing the efforts of the owner so that the latter can be sold more trucks. And if the big manufacturer buys one or two trucks, as they generally do, "to see if they can be operated economically, etc.," he will not buy additional trucks if the machines do not measure up to requirements.

Sells Sixteen Trucks in Nine Months

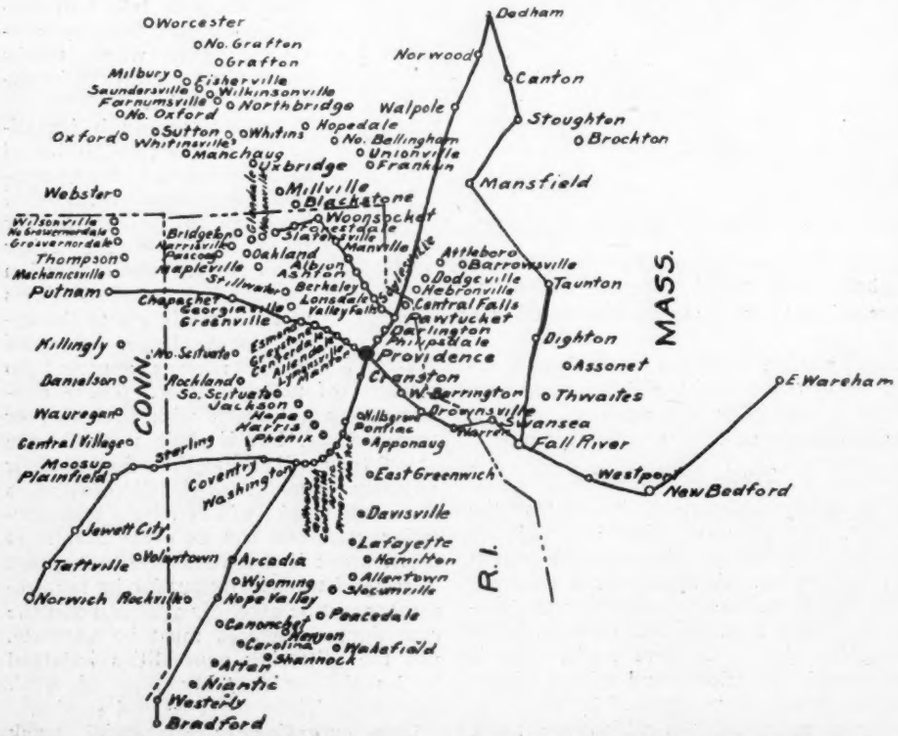
Illustrating the point made in the beginning of this article that operators of fleets of trucks engaged in general transportation are anticipating a greater use of highways and that selling transportation, not order taking, is real merchandising, is the case of E. P. Winward & Son, Fall River, Mass. This concern is operating a fleet of 17 Pierce-Arrow trucks, fifteen 5-ton and two 2-ton, which fleet was sold by the Foss-Hughes Company, Providence, R. I., distributor of the Pierce-Arrow line. E. P. Winward & Son is an old concern and specialize in motor freight service, in addition to the rigging business. This company formerly operated 50 horse-drawn teams.

The service in which this concern is specializing is affording highway transportation to textile manufacturers in Fall River and New Bedford, Mass., the centres of this industry in New England, and to 130 other cities and towns in Massachusetts, Rhode Island and Connecticut, and the radius of collections and deliveries is approximately 60 mi., with Providence, R. I., as a center. The cotton gray goods and other products of the mills are transported from the source of production to the shipping points, involving the hauls referred to, as well as those of material to the bleaching and finishing mills.

One of the Five-Ton Pierce-Arrow Trucks Loaded With Cotton on Its Arrival at Fall River From Providence

Value of Efficient Routing

An accompanying map shows the districts covered by the fleet of Pierce-Arrows and, as may be noted, the distance from Providence, which is 20 mi. from Fall River, the headquarters of the transportation company, to Westerly is about 57 mi., to Worcester 43 mi., while the other routes are less than 40 mi. Thus it will be seen that from Providence the routes radiate. From Providence to New Bedford is 34 mi., with East Wareham 20 mi. further. These distances are mentioned to show that long hauls are not indulged in. The advantages are that the drivers can complete a round trip in a day and return to headquarters at night, and permit of more profitable routing, which means operating with full loads on the return trip. All routing is performed at the Fall River terminals. Capacity loads are made possible by the use of a warehouse or assembling plants, operated much in the same manner as a central freight receiving station. The routing superintendent has a rack with the bills of lading, as well as order book, and it is his duty to make up loads, as well as arrange for return loads from the point of destination. This involves, of course, pick-ups on the return trip. The policy is to so arrange the routing that the returning truck will obtain a capacity load and without involving extra mileage.



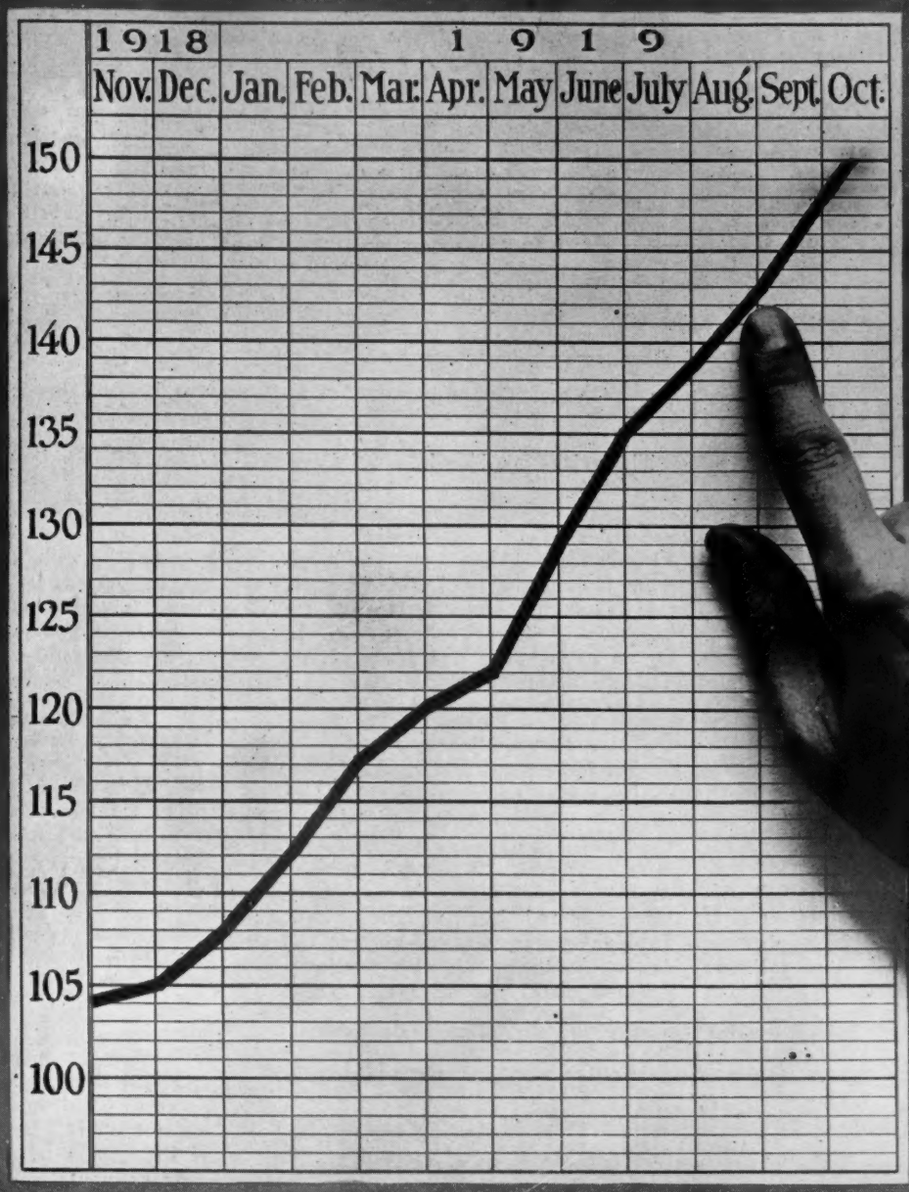
Showing the Textile Cities and Towns, Approximately 130, Served by the Fleet of Seventeen Pierce-Arrow Trucks Operated by E. P. Winward & Son, Fall River, Massachusetts

Inaugurate New Service

In June the company inaugurated a new service, that of transporting other than the products of the textile plants. It opened a branch or terminal in Providence, including a warehouse, and is to open a similar terminal at New Bedford. The company is anticipating the time when the common carriers will be forced to advance its rates and the probability that some of the freight service will be curtailed, particularly those not self-supporting. This applies more particularly to less-than-carload shipments and where transfer is made. The several handlings and re-routing are factors which contribute to the transportation costs of the common carriers, and it is believed that an effort will be made to eliminate, insofar as practical, these hauls when the period of reconstruction begins.

Indicative of the trend in transportation is discontinuance of the electric lines carrying freight as well as passen-

ROSS STEERING GEARS



150 Motor Truck Manufacturers, out of a Total of only about 230, are Now Using Ross Steering Gears. On sheer Superiority, they have become and they have remained "The Steering Gears that Predominate on Motor Trucks."

If any Manufacturer or any Prospective Truck Buyer wishes to know more about the Easy Steering, Safety and Reliability of Ross Steering Gears, write us for full information.

ROSS GEAR & TOOL COMPANY, 760 Heath St., Lafayette, Ind.

gers. An example in the territory served by the Winward Company is the Swansea-Seekonk line, an intermediate line between Providence and Fall River. This line transported much perishable freight. Although Providence is but 20 mi. from Fall River the service rendered by the common carriers is said not to be of the best. It takes from three days to a week for freight. Other shipments are also ineffective, losing time in frequent transferring and reloading.

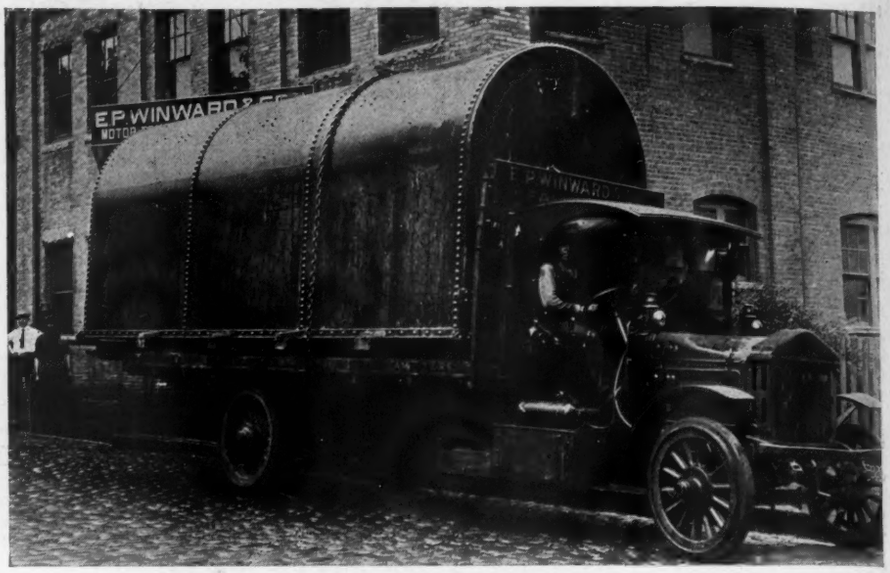
Practice Capacity Loads

The plan being followed by the Winward Company is that of utilizing the terminals at Providence, Fall River and New Bedford as centers, and employing pick-up trucks to collect and deliver the light material or small consignments. Commodities for Fall River collected in Providence are brought to the former place and distributed and vice-versa. If a shipment be had from Fall River to Worcester, Mass., for example, it is loaded on a truck destined for that city and when carrying textile goods. If the truck has a ton of such material only four tons of textile goods are loaded. This arrangement is made possible by the assembling warehouse.

Rates Afford a Profit

The policy being pursued by the company is to gradually develop the new business without attempting a service confined alone to general commodities. In time it is believed that the volume of business will so increase that other trucks will be added to care for the new line. In the meantime it is supplementary to the textile business.

The rate card which the company supplies to its prospects classifies the commodities into two groups, A and B, the rates being based on goods delivered at the terminal. Class A includes food products and perishables and is as follows:



A Five-Ton Tank, Part of an Entire Mill Equipment That Was Transported From One City to Another

The prices are based on solid weight, subject to the option of the company, and light weight material is charged on the basis of 12½ cts. per cu. ft. from Providence to Fall River and 17½ cts. from Providence to New Bedford. Extra heavy material requiring special handling is charged accordingly. Delivery in 24 hours is guaranteed, but rush delivery carries a special rate. All rates include insurance in transit.

Farmers Ship by Truck

At the time this article was prepared the company was making four round trips a day to Providence, decreasing the hauling distance of the common carriers by 30 mi. Shippers of perishables are taking advantage of the superior service rendered by the trucks and the Providence Co-operative Market Gardeners' Association, with headquarters at Providence, is shipping large quantities of fruits, vegetables, etc., by the Pierce-Arrow trucks.

In connection with the rates it is interesting to note that the company adheres strictly to the rates, refusing business if the prospect tries to shop. The shopper is discouraged, particularly the telephone shopper. If the prospect will not identify himself he obtains a curt dismissal. The "gyp" truckman is not worrying E. P. Winward & Son, for they believe the process of evolution will soon eliminate him.

The company hauls a large amount of machinery and mill equipment. One of the feats was the transporting of a 5-ton tank from a New Bedford mill to Pawtucket, R. I. Another contract undertaken was the transferring of the entire equipment of a mill from one city to another.

On the day the writer called on the company one of its trucks was engaged in hauling 28 bales of cotton from the Merchants' & Miners' wharf at Providence to a mill in Fall River. The trucks are not overloaded, it being the policy of the company to conserve its fleet.

Adjustments and repairs are effected at the Fall River terminal, the ground floor of which is given over to a garage.

To Fall River	From Providence	To New Bedford
	Weight	
50c.	100 lb.	75c.
70c.	200 "	$1.00
90c.	300 "	1.25
$1.10	400 "	1.50
1.25	500 "	1.75
25c. per 100 lb.	Above 500 lb.	35c. per 100 lb.
	Minimum charge 100 lb.	
	Class B	
To Fall River	**Weight Per 100 Lbs.**	**To New Bedford**
30 cents	Minimum charge 500 lb.	40 cents

Tire Man Warns Truck Owners

"Whenever I see a pneumatic tired truck go by with tires that show under inflation I telephone the owner of the truck and warn him of the consequences," says H. H. Hoff, manager of the Duluth, Minn., branch of the Goodyear Tire & Rubber Co. "Any one who knows tires knows that pneumatics must be kept up to the proper pressure to get the proper mileage out of them and nothing destroys them quicker than running them with heavy loads and not enough air in them. I find that calling up truck owners and calling attention to the abuses subjected on the tires by their drivers always gets a courteous 'thank you,' for as a rule the owners naturally want to get the longest life possible from their tire investment. It tends to make the truck driver pay more attention to this feature, too, for he doesn't care to have the boss jumping on him for this sort of thing more than once.

"With the coming of pneumatic tires for trucks this is a matter that must be driven home to drivers in every way possible, for on it depends the success of the tire."

Owen Tire & Rubber Co., Cleveland, O., announces that the production of the plant has reached 425 tires per day and that the company is about six months behind time in filling orders. All of the old officers of the company were re-elected at the annual meeting with the exception of Chas. S. Reed, secretary, who was succeeded by William I. Creese. Other officers of the company are W. C. Owen, president, and W. R. Green, treasurer.

SIVYER (S) CASTINGS

The Sivyer Service of providing Electric Steel Castings has for its objects the decrease of machining costs and the increase of wearing quality and life. Both are attained by methods which result from long experience and begin with the design of the casting itself. When we find that a casting we are asked to furnish is of a design not consistent with good foundry practice, we study its function in the completed unit and offer the necessary suggestions to make it a really practicable casting job without affecting in any way its function and efficiency.

Secondly: Sivyer Service analyzes the functions of the casting and specifies the proper composition steel for the job; long experience with carbon and alloy steels has enabled us to reduce costs and increase quality remarkably for many different industries.

Thirdly: Sivyer Service makes a careful study of the pattern and molding problems involved, for improper gating and insufficient risers are often the greatest wasters of machining labor and metal.

Fourthly: Sivyer Service analyzes carefully the proper annealing methods to be used and controls their proper application through unfailingly efficient equipment and men. In short, the Sivyer Service supervises every step necessary to secure unusually and unfailingly good castings of electric steel. It never relies on one factor alone, relies very little even on the natural freedom of electric steel from occluded gases and on its commonly recognized merits in resisting crystallization. It also depends but little on the inherent scientific accuracy of the electric furnace process. From casting-design to sand-blasting and tumbling, the fundamental superiority of Sivyer Steel is due to its men and metal. Their value is best proved by the fact that, although the production of steel castings is generally looked upon as a local one, the Sivyer market is national.

Rear-spring seat and radius rod bracket—of Sivyer Steel

ON the castings shown on this page, the heavy bosses and light wall sections used to cause cracks and shrink-holes, bringing about costly rejections during and after machining. When we were asked to devise a remedy we provided new methods of heading and gating that did away with cracks and shrink-holes. Not only do these Sivyer castings cut rejections and machining costs, but the thorough Sivyer annealing and the crystallization-resisting properties of Sivyer Electric Steel provide castings certain to be unaffected during the life of the truck by the incessant shocks and jars that too often crystallize and break ordinary chassis castings.

SIVYER STEEL

SIVYER STEEL CASTING COMPANY, MILWAUKEE

Metal and Rubber Markets

Steel Prices Firmer

Prices for all steel products continue to grow firmer, but this has no connection with the producers. Their output has increased, but the mills continue crowded. Those who have steel supplies ready for immediate shipment are asking higher levels, but there is no indication of an advance in current prices. A large volume of business is ready to be placed, but the mills are in such a condition that very few new orders are being booked.

Steel Products Prices

Per ton, Pittsburgh—			
Bessemer billets	$38 50	a	....
Open hearth	38 50	a	....
Forging billets	51 00	a	....
Sheet bars	42 00	a	....

Sheets

The following prices are for 100-bundle lots and over f.o.b. mill:

Blue Annealed Sheets—			
Pittsburgh (base)	$3 55	a	....
Philadelphia	3 79	a	....
Chicago	3 82	a	....
Galvanized Sheets of Black Sheet Gauge—			
Pittsburgh	$5 70	a	....
Chicago	5 97	a	....
Tin—Mill Black Plate—			
Pittsburgh	$4 35	a	....

Tin Plate

Tin plate, pme, per base box.	$7 00	a	....
Terne plate, I. C.	7 05	a	....
8-lb. coating, per pkg.	13 80	a	....

Iron and Steel at Pittsburgh

Bessemer iron	$29 35	a	....
Bessemer steel, f.o.b. Pitts...	38 50	a	....
Skelp, grooved, steel	2 45	a	....
Skelp, sheared, steel	2 65	a	....
Ferromanganese (80 per cent.)	110 00	a	....
Steel, melting scrap	19 00	a	19 50
Steel bars	2 35	a	....
Wire rods	52 00	a	....
Iron bars	2 75	a	....
Plain wire	3 00	a	3 10
Plain wire, galvanized	3 70	a	....
Cut nails	4 92	a	....
Hoop steel	3 05	a	....
Chain rods	52 00	a	....

Copper—There is very little buying in the copper market at present. This is due to some extent to the longshoremen's strike. Prices are: spot, 21⅛c; November, December and January, 21¼c; February, 21⅜c, and March, 21½c per lb.

Aluminum—The market remains quiet. Virgin metal is quoted at 33c per lb. in ingots of 98 to 99 per cent.

Tungsten—Local business is unchanged, but the export market is active. Chinese scheelite is selling at $7 per unit.

Other Metal Products—The following prices are current for brass and bronze products:

Copper sheets, hot rolled	32 50	a	....
Copper bottoms	40 50	a	....
Seamless tubing, bronze	39 00	a	....
Cut lead sheets	9 75	a	....
Copper rods	24 50	a	....
Copper wire	26 00	a	....
High brass wire	27 75	a	....
High brass sheets	27 75	a	....
High brass rods	25 75	a	....
Low brass sheets	29 50	a	....
Low brass wire	29 50	a	....
Low brass rods	30 25	a	....
Brazed tubing, brass	38 00	a	....
Brazed tubing, bronze	43 25	a	....
Seamless tubing, brass	34 00	a	....
Seamless tubing, copper	35 50	a	....

Prices of Old Metals

Aluminum continues to be in fair demand. Zinc and lead are firm. Copper and composition are unchanged and quiet.

Aluminum—	Buying.	Selling.
Cast scrap	22 a23	25 a25½
Sheet scrap	21½a22	23½a24
Clippings	24½a25¾	27 a28
Copper—		
Heavy machinery comp.	16¼a16½	18 a18½
Heavy and wire	15¾a16	17½a17¾
Light and bottoms	13¾a14	15 a16
Heavy, cut and crucible.	17 a17¼	19 a19¾
Brass, heavy	9 a 9¼	10¼a10¾
Brass, castings	11 a11¼	12 a12½
Brass, light	7 a 7½	9 a 9¾
No. 1 clean brass turn'gs	9 a 9¼	9¾a10¼
No. 1 comp. turnings	13 a13½	15¾a16
Tea lead	4¼a 4½	4¾a 4⅞
Lead, heavy	5 a 5¼	5½a 5¾
Zinc, scrap	4¼a 4½	5 a 5½

Plantation Rubber Firm

No large business has been reported in plantation rubber. The firm tone of the market is maintained and prices show a further advance. Latest reports claimed a weak market in Brazil, while others state that the lowest offerings from Manoas are 55c.

Para—Up-river, per lb.	52	a	..
Up-river, coarse	34½a		35
Island, fine	48	a	48½
Island, coarse	23½a		..
Caucho, ball, upper	35	a	..
Caucho, ball, lower	..	a	31½
Canada	23	a	..
Plantation—First latex	53½a		..
Brown crepe, thin, clean	44	a	45
Rolled crown, crepe	39	a	40
Smoked ribbed sheets	52½a		..
Centrals—Corinto	34½a		..
Esmeralda	33½a		..
Guayule, wet	25	a	27
Guayule, washed and dried	..	a	..
Balata, block, Ciudad	76	a	78
Balata, block, Columbian	56½a		..
Balata, block, Panama	42	a	43
Balata, sheet	*1 00	a	..
Mexican—Scrap	33½a		..
Slab	*27	a	..
African—Maresi, red	..	a	..

*Nominal.

Scrap Rubber—The market is featureless, there being no important demands. Prices are steady and unchanged.

Tires—Automobile	3½a		..
Bicycles, pneumatic	2½a		..

American Trucks Used in Australian Service

The Australian postal authorities in New South Wales found themselves confronted with a difficult transportation problem about a year ago. Mails for the east coast of Australia coming out of Adelaide and surrounding towns, were stopped at Broken Hill near the railhead. The Darling River, offering excellent transportation facilities to the coast, was 130 miles away.

Mails, especially during certain seasons of the year were heavy, a fact which demanded something more than the ordinary automobile. The country was only sparsely inhabited, which meant that a breakdown would tie up operations for quite a while. Added to this was the fact that the roads were none too good. The Morrison Brothers, of Broken Hill, saw the difficulty and began investigating the possibilities of motor trucks. England offered nothing and they turned to the United States. After a thorough canvass of the truck field they determined upon the Clydesdale 2-ton model.

They then submitted their plan to the postal authorities and were awarded the contract to carry the Royal mail from Broken Hill to the town of Wilcannia. They made the round trip every two days, making the various points on the route on absolute schedule time.

Columbia Motor Truck & Trailer Company Adopts a New Standard Warranty

The Columbia Motor Truck & Trailer Co., Pontiac, Mich., has adopted a new guarantee certificate, which is given with each truck purchased. Particular attention is called to three cardinal features of this guaranty embodied in its present form.

First: It gives the purchaser a concise, condensed guaranty in plain English so that there may be no misunderstanding.

Second: It covers the principal features of the Columbia truck by special long time guarantees.

Third: It provides a protection for the dealer in, once and for all, determining exactly what service he will be called upon to give to the user and specifies without question exactly what the user's rights are from the service standpoint.

It also provides twelve service coupons, one for each calendar month of the year. These coupons are used in the following manner:

When a truck is sold, the date of the sale is placed upon coupon No. 1. The succeeding coupons are dated consecutively with the following months of that year. When the truck is presented for service or inspection as outlined on the back of the guaranty, the service man tears off coupon No. 1 and writes on the back of No. 2 the date on the former and signs it.

This makes it impossible for the user to tear off three coupons at once and say that his truck has been presented regularly for inspection.

The whole life and value of this guaranty and coupon service is dependent upon the owner of the truck presenting his truck each month for this inspection and that the lapse of three consecutive months will void the whole proposition. All grease and oils to be used on these monthly inspections are to be paid for by the owner of the truck. This will in a small way compensate the dealer for this service. It also gets the customer in the habit of buying oils and greases and opens the way for the sale of gasoline also.

Why there is *real money* in selling this *real truck*

*2. Our owners do the selling for us**

**By an Atterbury Dealer*

10 years of truck making experience behind each ATTERBURY

In a certain Western city (name on request), a crowd of men get together once a week for lunch.

Every man is an owner of an Atterbury truck.

Over the cigars and coffee they exchange stories of the performance of their Atterburys.

Then one of them speaks up—"I hear Smith & Co. are going to buy a truck. Let's get after him and make him buy an Atterbury."

And against that array of satisfied owners, Smith hasn't a chance in the world. He buys an Atterbury—and joins the "Club."

.....

This is an unusual case, of course—we don't know of another such "Club." But it would be an impossibility with any but a *real* motor truck.

And it is typical of the way Atterbury owners are helping to boost Atterbury sales in every city.

ATTERBURY MOTOR CAR COMPANY, BUFFALO, N. Y.

ATTERBURY

MOTOR TRUCKS OF MAXIMUM SERVICE

Unusual Traction and Grade Conditions Overcome by Trucks in New Hampshire Lumber District

Salesman Acquaints Himself With Existing Conditions Before He Consents to Transact Truck Sales

By C. P. SHATTUCK

AN unusual demonstration of the ability of motor trucks to withstand severe usage is that of three Duplex Four Wheel Drive trucks in service with the White Mountain Ice Cream Freezer Company, Nashua, N. H. This concern utilizes a large amount of white pine in constructing its staves as well as large quantities of board to make the containers in which the freezers are shipped. The factory, which is located at Nashua, carries the major portion of the production, but is assisted by a mill 6 miles from Nashua, which turns out staves exclusively, for the building up of tubs.

Owns Timber Tracts

The white pine planks, from which the staves are sawed or cut, come in 14 ft. lengths and approximately 3½ in. thick, are seasoned and then shipped to Nashua by rail. Vast quantities of staves are required and to maintain a sufficient supply of seasoned wood involves lumbering on quite a large scale. The company owns large timber tracts in and around Purgatory, about six miles from Lindboro, which is the nearest railroad, and it is 10 miles from the saw mill in the timber tract to the stave mill.

Ordinarily the hauling of logs, planks and boards from the timber tract would be a simple proposition by either horses or trucks, but the tract from which the material is being secured is well named Purgatory. There are two steep grades, one of which is named Purgatory Hill, and the surface of which does not afford good traction for ordinary vehicles. In addition there are sharp right angle turns on this hill, one in particular being extremely difficult to negotiate with a motor vehicle. The road leading to Purgatory Hill is rutty and in the spring a heavily loaded vehicle will sink to the hubs in the soft earth of certain sections.

At the present time timber is taken out from what the lumbermen term the "hole," a place abounding with soft ground, stumps and boulders. Equally bad is the road from the saw mill. For this reason it is necessary during the very rainy periods of the year to pile the logs that have been sawed and planked so as to be ready to haul when weather and road conditions permit. The work involves the hauling of the logs to the mill and the transporting of the planks and boards to piles.

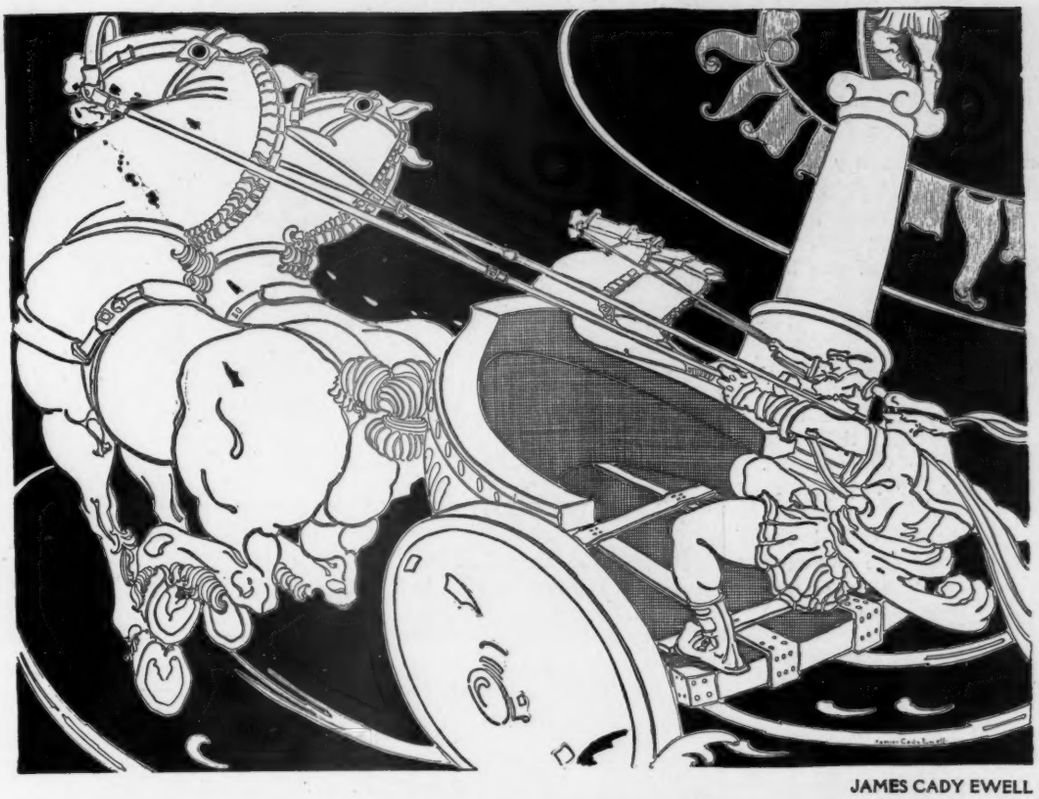
These were the conditions confronting the trucks when their use was advocated by Charles Shamlin, salesman for the Linscott Motor Company, of Boston. Mr. Shamlin is a specialist in lumber hauling with trucks and despite the unusually severe conditions under which the trucks would operate, figured that the Duplex with their 16-in. clearance and variable speeds could accomplish the work at a low cost. It was stated that oxen only could be used under the existing conditions. The maximum capacity of four oxen was figured to be between 500 and 800 ft., based on the haul up Purgatory Hill.

Knowledge of Working Conditions

Mr. Shamlin was not content to sell the trucks, one of which has a wheelbase of 130 in. and termed as the lumber chassis, without a thorough knowledge of the conditions under which they would work, so he took charge of the hauling operations and at the same time the writer visited the camp was driving the 3½-ton Duplex. The trucks, two in num-

A Sample of the Roads in and Around the Saw-Mill. Over 70,000 Feet of Lumber Have Been Hauled From This Section.

Loading the Trucks With Boards in the "Hole," Which is Rightly Named, as Indicated by the Illustration.

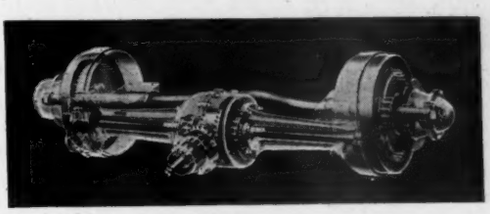


JAMES CADY EWELL

POWER-CONTROLLED POWER

—lives in every shaft, bolt and gear of Clark Axles. Their masterful stamina laughs at road shocks and the brutal side thrusts of sharp corners.

Clark Axles are built to handle without flinching the terrific driving energy of many Roman stallions dynamic in the modern engine.



A disc for resiliency and steel for strength make Clark Steel Wheels ideal for motor trucks—for solid or pneumatic tires.

WRITE FOR SPECIAL BOOKLETS ON CLARK AXLES AND CLARK WHEELS.

CLARK EQUIPMENT CO.
BUCHANAN - - - - - - MICHIGAN

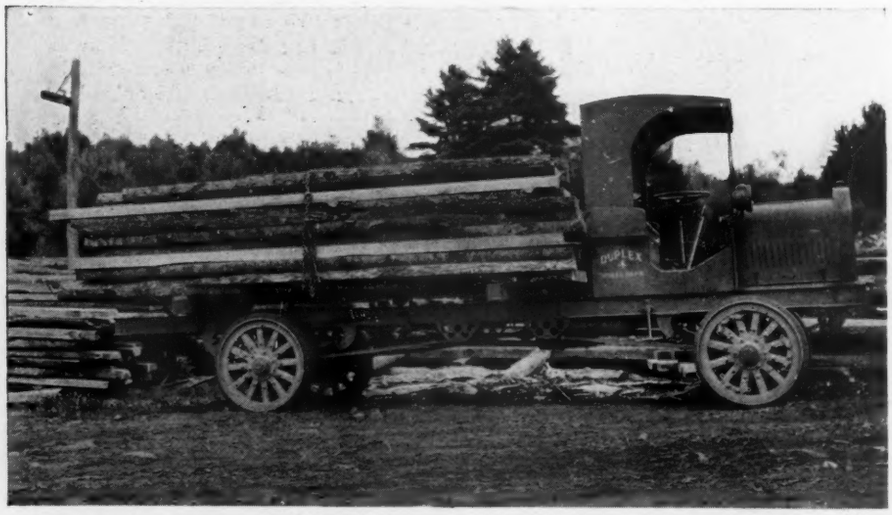
Clark Internal Gear Truck Axles

ber, began operations last winter, being engaged in hauling logs from the two timber tracts to the mill at Milford, the stave mill. The machines operated every day and were, of course, favored by an open winter, with comparatively little snow. The trucks broke out their own roads, using plows when necessary and while they did not haul as many feet of timber as during the summer they made an excellent showing.

Conditions Reduce Efficiency

Due to the poor traction and the steep grades of Purgatory Hill, the trucks haul but half a load or about 1800 feet from the "hole" to the top of the hill. The three trucks haul boards and planks to the top of the hill, accumulating a reserve pile of lumber from which is taken the balance of the load before completing the trip to the railroad at Lindboro, six miles distant. These boards when seasoned weigh about 2½ lb. to the ft. and considerably more when green. About four truck loads are required to fill a freight car.

At the time the writer visited the timber tract the trucks were engaged hauling boards both from the "hole" and the top of the hill to the railroad. These were taken from a section where a gear ratio of 64:1 is required to start, owing to the traction conditions, the ground being soft and bestrewn with boulders. On Purgatory Hill a gear ratio of 32:1 is necessary. It is unlikely that the average truck could start from the "hole" with the load unless resort was made to what is known to drivers as the "jumping" process. Then again, the trucks tilt to a considerable angle which with the need of drive on all wheels would create a no easy task for the two-wheel drive truck.



A Sample Load of Green Planks Ready to be Dumped Besides the Conveyor at the Stave Mill

Haul Three Thousand Feet the Load

The planks used to construct the freezer staves average about 130 lb., although some weigh as high at 145. These are hauled from the "hole" to the mill, comprising of 3000 ft. to the load. Three round trips are made a day to the stave mill when hauling the planks. The distance is 10 miles loaded and 8 empty, the longer distance being taken to avoid a couple of hills equally as bad as Purgatory Hill. In hauling logs the trucks carry 198 ft., which is practically equivalent to 1980 ft. board measure. This haul is from places in the forest where the lumber is felled to the saw mill over an equally bad road. The 3½-ton is said to have made a record of seven trips in one day from the saw mill to the stave mill. About 170 ft. was averaged per load.

The larger Duplex was added to the fleet on July 8 and up to August 13 had traveled 2844 miles. It is said that over 400,000 ft. of lumber have been hauled by the trucks and, according to Mr. Shamlin, the trucks are now averaging between 65 and 70 miles the day. Work starts at seven in the morning and continues until five at night, with a brief intermission for lunch. Mr. Shamlin states that the 3½-ton truck is averaging 5.6 miles a gal. of fuel and that the oil consumption a day is one qt.

The writer accompanied the big truck from the railroad to the "hole" and made the return trip over Purgatory Hill with the final load of planks, which are taken to the stave mill each night at the completion of the board haul. It is putting it mildly when it is stated that handling even a four-wheel-drive truck requires careful driving to make the initial start against the increased inertia of soft soil and get out of the "hole" to the road leading to Purgatory Hill. Nearing the top of this hill is an extremely difficult right angle turn and with a corresponding bad traction and grade. Despite these adverse conditions the truck trundled along without apparent effort and in bad places performed amazingly well.

Transferring a Load of "Toppings" at the Top of Purgatory Hill. Only Half a Load is Hauled Up This Hill

The Service Angle

There is a service angle to the story that should not be overlooked and that is the need of salesmen who place trucks under conditions similar to those existing with the White Mountain Ice Cream Freezer Co., to remain with the machines and drivers until the latter have thoroughly mastered their use. It is doubtful if the average truck driver could make good handling trucks in such timber work without an intensive training under the supervision of a man familiar with lumbering conditions and the proper use of trucks. Mr. Shamlin's policy not to turn a truck over to a driver until he is competent and to occasionally call and note how the work is progressing, as well as to inspect the machines, is one that should be copied by those salesmen merchandising trucks in lumbering territory. To successfully sell trucks to lumbermen requires a knowledge of lumbering methods as well as a careful study of the roads and grades over which the machines will operate, for the salesmen not possessing this data will not be able to advise the prospect how to obtain the greatest efficiency at the least possible cost of maintenance. And trucks operating under conditions, similar to those described in this article, will require more watchful care than those operating over good roads and convenient to the service station.

Fire fighting apparatus of Detroit, Michigan; Norwalk, Ohio; Mayville, Kentucky, all fully equipped with 'NOBBY CORDS.'

THAT 'NOBBY CORD' PNEUMATIC TRUCK TIRE equipment has aided materially in reducing fire loss is proven by their early adoption over "SOLIDS" and cushion type in municipalities such as Chicago, Woonsocket, Framington, Detroit, Norwalk, Mayville, Chattanooga, Augusta, Macon, Grand Rapids, and many other important cities.

Reports from local chiefs confirm—more speed—more mileage—less gas and oil—reduction in mechanical repairs and vibrations—and lastly, tractive properties which practically eliminate the dangerous side-sway, and permit of a much shorter turning radius.

'NOBBY CORD' effectiveness applied to thousands of busy trucks has proven that

'Nobby Cords' Save in Every Phase of Truck Operation

Advertising Value of Trucks Cannot be Measured in Dollars and Cents

DID you ever ask a merchant whether or not it was cheaper to use motor trucks or horses in delivering his goods? If you have, you have invariably seen him hesitate to answer your question. It is not because he does not want to answer, but because the possibilities of the truck are so great and the field of usefulness of horse-drawn vehicles so limited, that the request for a comparison promptly creates a difficult proposition.

Admitting for the sake of argument that it costs twice as much to operate a motor truck as it does a two-horse team, the fact is borne out by Boston department store experience that one motor truck will cover territory which previously required three two-horse teams to cover. Simple fractions will answer your question—it costs only two-thirds as much to deliver your merchandise in the territory as it formerly did with teams.

But when you said that it cost twice as much to operate a truck as it does a two-horse team, you are not taking the exact proportions, for it does not cost twice as much. The cost of operating trucks by the Jordan Marsh Co., of Boston, the largest department store of that city, is but 60 per cent. greater than the cost of a two-horse team. Therefore, if it costs $12 per day for a two-horse team, it costs $19.20 per day to do the work which would cost you $36 to do with horse-drawn vehicles.

The Jordan Marsh Co. uses 22 two-ton Autocars for delivering its parcels in the city of Boston and the immediate suburbs the year round. Each Autocar travels from 50 to 85 miles per day in every kind of weather, requires but one man's services for each truck, who loads, operates the car and delivers the parcels without assistance, and whose average load is 350 parcels.

Routes Increased in Summer

During the summer season additional delivery routes are laid out to Hull, Manchester and Magnolia, these places being separated from Boston by 28 miles of roads and side streets. On the summer route one truck to each locality handles the business, and two men are used to expedite deliveries.

The year round trips of delivery trucks take that territory within 15 miles of the Jordan Marsh Co. store in all directions excepting where it is so sparsely populated as to make such deliveries inadvisable. In those instances the parcels are turned over to the Clearing House Parcel Delivery Co., a semi-co-operative concern backed by many of the large retailers of Boston, whose work and methods have already been detailed in the COMMERCIAL CAR JOURNAL.

Boston merchants have adopted the one-delivery-per-day system. This was made effective during the war to conserve labor, but so successfully has the plan worked out that the merchants are unanimously in favor of continuing it.

One of the leading concerns in suburban Boston which has worked out an accurate cost system for deliveries of its goods is the Winchester Laundry Co., Winchester, Mass., a suburb eight miles northwest of Boston. This concern is an active competitor for business with laundries located within the city limits, besides having the advantages in its operation which come to suburban companies.

Effective Advertiser

"There is one thing that I have not put down in my cost system," said an official of the company. "I have not deducted anything for advertising to the credit of the fleet of thirteen motor trucks which we operate. Of all the advertising which we ever have done, none has attracted so much attention as our trucks, painted snow white, with the small, semi-circular name plate on each side of the covered body. Everybody knows a Winchester laundry truck as far away as they can see it."

The trucks are ton-and-a-half Whites and G. M. C.'s. One man only is employed to a truck, acting as his own chauffeur and delivery man. What the company pays these men in wages, what the overhead charges for the management of the collection and delivery department of its business is, are items not included in the following figures, as they are taken care of under another department.

Figuring that the life of a truck is not over five years, although many trucks are in operation that have done more than that period of service, the company charges off against the trucks approximately 20 per cent. in depreciation. The items of insurance and taxes amount to $186 per month. Here are the actual costs as charged against the motor trucks for a month, an average month being taken:

Depreciation	$485.66
Taxes and insurance	286.08
Garage (for board of trucks in a public garage located conveniently to the plant)	115.00
Gasoline and oil	341.64
Tires	341.77
Repairs	658.00
Truck expenses (miscellaneous)	157.65
Total cost of 13 trucks per month	$2,385.70
Total cost per truck per month	183.51
Total cost per truck per day	7.34

"Those figures represent the maximum. There are some things charged against the trucks in those items which ordinarily would not be charged against trucks by anyone using them. The depreciation is a maximum figure. Under truck expenses are some items which other concerns might charge to other accounts. The item for insurance is the maximum, and some concerns would charge part of that to other accounts. Those figures represent the truck expenses both directly and indirectly," said the official.

When the company used horse drawn vehicles, the income per vehicle per week amounted to $240. They were limited to a close in territory. Now, with trucks, and with longer routes and many times the territory, each truck represents an income of $400.

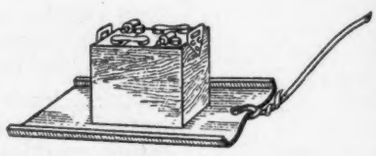
The gain in income per vehicle is $160. The increase in operating costs of motor truck over horse drawn vehicles is $20 per week.

That does not, however, tell the whole story. The matter of advertising has already been mentioned. The matter of volume of business is limited now, not to territory served, as was the case of the horse-drawn vehicle days, but to the capacity of the plant. Within the next year the capacity of the plant is to be greatly enlarged and the part which motor trucks have done in making such business possible cannot be told in terms of dollars and cents.

The trucks are used in the collection and delivery of laundry from the plant to the customer and vice versa.

Storage Battery Sled

Workmen at the service and repair station of the Valley Motor Vehicle Co., Inc., Roanoke, Va., have made a simple device for handling storage batteries around the shops, when the batteries are to be moved from one part of the plant to another. Instead of carrying the heavy batteries around, they place them on a "sled" made from a piece of a Ford running board, turned upside down, and hauled by a wire inserted through a hole in the piece of running board. Simple little thing, yet it saves much heavy lifting around the Valley shops.



FORD RUNNING BOARD USED FOR BATTERY SLED

FISK
TRUCK TIRES

NO compromise between these big sturdy tires and their jobs—they are made for the cobble stones and the cuts. In town and out of town they give a big account of themselves and live up to the standard demanded of and by Fisk. Measure them against all-comers in any way you will—their value is in excess at every point: a square deal tire through and through.

To be "the best concern in the world to work for and the squarest concern in existence to do business with"—that is Ideal.

Next Time—BUY FISK
From your dealer

Colorado Dealers' Truck Tour is a Big Success

ANOTHER educational event that may be indexed in the familiar "Ship by Truck" tours division of the country's many and various enterprises, came to a successful termination at Denver, when the last of thirty-six trucks and eight trailers came to a halt after a seventy-five mile trip from Denver through Lafayette, Boulder, Longmont, Berthoud, Loveland, Fort Collins, Windsor, Greeley, Platteville, Fort Lupton, Brighton and return. The enthusiasm exhibited by large crowds indicated the citizens' desire to do their utmost to co-operate for the success of the event.

This enterprise was carried out under the auspices of the Denver and Rocky Mountain Auto Trades associations.

Maintained Clock-Like Schedule

The trip was in charge of Captain H. H. Hall, experienced in the handling of troop transports in France, and who maintained a strict schedule throughout the trip. There were parade features and other truck day features to arouse interest, and many local dealers drove trucks out a few miles from their towns to join the caravan, lengthening it to nearly a mile by the time it reached some of the towns.

The speakers, which included M. L. Poteet, director of the Firestone ship-by-truck bureau, and Dwight H. Elder, manager of the Troy Trailer Sales Company in Denver, did much in arousing the enthusiasm of the many farmers that were in the crowd.

Imparted Specific Information

Literature describing the advantages of shipping by motor truck was distributed en route, and "Ship-by-Truck" buttons were given to everyone. Not only were arrangements made to have large crowds on hand when the trucks were due to reach the various towns, but committees along the lines were requested to gather specific information regarding actual cases showing substantial savings in expense or superior service provided by truck shipping in their communities.

Such demonstrations and experiments as this are bound to accelerate the idea and will do much for extending the field for the use of motor trucks.

There was but one instance of trouble on the trip, due to a foul gas feed pipe, and that only entailed a stop of a few moments. All the trucks carried loads. The three most heavily loaded were the Bethlehem, which carried a full-sized automobile; the Duplex, which carried a load and pulled a trailer load of gravel for concrete, and the Republic, with six 480 one-lb. cans of oil, ten crates of filled oil cans, and two wet storage batteries for operating the Unaphone, a pleasant standing musical instrument aboard the truck, the whole making a load of 4800 lb.

The trip has been considered a complete success and will be but a fore-runner of many similar events to be held in the future in that section of the State.

The Annual Convention of the Rocky Mountain Auto Trades Association started just as the tour was completed.

Bethlehem Motors Corp., Allentown, Pa., has filed a statement with the New York Stock Exchange, giving surplus account of the corporation for the year ending June 30, 1919, as follows: Surplus June 30, 1918, $567,934; add net profit for year ended June 30, 1919, $199,-124; total surplus, $767,058; deduct extraordinary charges and cost of financing preferred stock, $194,995; preferred dividends, $74,866, and common dividends, $37,500; P and L surplus, June 30, 1919, $459,646.

American Bosch Magneto Corp., Springfield, Mass., announces that its sales for the six months ending June 30, 1919, amounted to $2,279,296. After deducting cost of sales and all necessary expenses including factory depreciation, the net operating profit for this period was $334.155.

Four Views of the Tour Snapped Enroute

Upper left: The motor truck train lined up at the civic center in Denver prior to its start for Colorado Springs. Upper right: Where the train stopped at Palmer Lake for lunch. Lower right: Bethlehem carrying a full-sized touring car. Lower left: The Duplex pulling a Troy trailer; each carrying a load of concrete gravel

Scientific Research
by the Hoover Laboratories

Working steel into perfect spheres to .0001 inch calls for precision in every operation.

To make a lot of ⅝ inch steel balls today so that they will not vary more than .0001 inch with another lot next month, is truly a scientific accomplishment, both in the preparation of the materials used and the production methods.

To do a certain thing scientifically means to permit of no guesswork. Each step, from start to finish, must be taken with accuracy. The procedure must be made with definiteness.

In the great Hoover plant there have been developed research and control laboratories such as are not found in any other ball plant in the country.

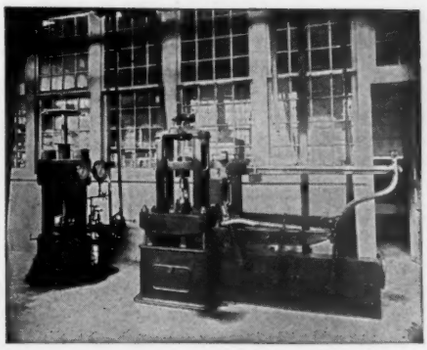
Such extreme measures are bound to carry the name Hoover far and beyond its present far-reaching scope.

One of the functions of the Hoover laboratories is to test for defects in raw steel—such as decarbonization, laps or seams. Close co-operation between the Hoover Steel Ball Company and the steel mills has done much to perfect raw steel for ball-making purposes. But in order that the high quality of Hoover Steel Balls be guarded and made certain, no effort is spared.

All Hoover balls are made from the same kind of steel—a special chrome alloy. All stock is subjected to the same special heat treatment.

Automatic hardening furnaces insure uniformity of hardness. Automatic grinding and gauging insure uniform finish and size.

This is the largest steel ball plant in the United States, making it possible for us to meet all shipping specifications.



Every batch of Hoover balls is subjected to compression and deformation tests. The Hoover research and control laboratories are provided with the most elaborate equipment to insure maintenance of Hoover highest quality.

Hoover Steel Ball Company
Ann Arbor Michigan

HOOVER
STEEL BALLS

Michigan Establishes State Garage Where Road-Building Trucks Are Overhauled

MICHIGAN, whose fame in connection with the motor car lies in the fact that it is the center of the automobile industry rather than in the possession of good roads, is preparing to make amends for any laxness in the latter respect and is setting about this task with a thoroughness that involves some unusual features.

First of all, Michigan recently voted a bond issue of $50,000,000, the larger part of which will be used in establishing trunk lines connecting every part of the state. But it is in the methods that will be employed, rather than in voting this sum, that interest centers.

To Have Real Roads

With the first proposal of the government to apportion trucks and road machinery to the states for use on the highways, State Highway Commissioner Frank F. Rogers got busy. He made it plain that his policy was to accept everything offered, and he has stuck consistently to that line, with the result that next year Michigan will have a road building equipment second to none.

Mr. Rogers might have accepted whatever was offered and turned it over to the different counties in the shape it was received, but he is too thoroughgoing for such a plan. His first move, after being assured of an allotment, was to establish a big garage in a central location where everything would be put into good working condition before it was sent out.

Charlotte was selected as the site of this garage. An abandoned truck plant was taken on a two-years' lease, with the option of buying it at the end of that time. This building is being equipped mechanically to handle any and all repairs, and it is the intention to eventually manufacture many of the parts that will be required for replacements.

The building is 250 x 50 ft., three stories in height, and admirably adapted to the purpose. The machine shops will be located on the ground floor. On the second floor will be the repair shops, with the usual garage service and a paint department. The third floor is given over to storage and stock rooms, where will be kept every part for every truck used by the state on its highways. Parts have arrived in carload lots from the government, and the stock room is such as would do credit to a truck plant of the first class.

The garage will be conducted on a strictly business basis, with an elaborate cost system in vogue. There is a reason for this, aside from the economy that will be effected. While the government, in theory, is loaning this vast motor equipment to the state, it is expected that it will remain permanently in the use and possession of the highway department. The government takes nothing for the initial cost of these trucks, which in the open market would run far into the millions. The state pays for the loading on freight cars, the haulage charge, and the work done on them after they reach the plant in Charlotte. All of these charges, plus overhead, rental, labor and other expenses has so far averaged less than $75 per truck. To this is added the cost of new steel dump bodies and hoists, which amounts to $650 each. The Horizontal Hydraulic Hoist Co. and the Heil Co., both of Milwaukee, are installing these bodies on the ground.

Reimburse State

When the trucks are delivered to the counties they are required to reimburse the state for all the expenses incurred, which amounts to about $725 for each truck. They will also have to bear the expense of repairs or renewals after the trucks are in commission. They will continue to be under the jurisdiction of the state highway department, and subject to recall. Thus is seen the necessity of keeping close tab on all expenditures.

It is expected that when the entire allotment has been received the trucks will number more than 1000. They are all in good mechanical condition, most of them never having been used. The principal evidence of age is caused by exposure to the weather. They are immediately overhauled, painted a battleship gray, and lettered as belonging to the Michigan state highway department.

Valuable Federal Aid

This is only one item of the government's gift. Tires and parts for replacement, even to the rebuilding of motors, are being received on the same basis as the trucks. In addition there is an allotment of steam shovels, clamshell unloaders and buckets, rock crushers, concrete mixers, dump wagons, an asphalt plant, industrial railway and many other items that will come in handy, and which would have set the state back a long way if it had been compelled to buy this equipment in the open market. There are even 5000 steel fence posts that will be used in sign-boarding the trunk lines, and a number of motorcycles with sidecars that the state police will use to patrol the main highways.

All is grist that comes to Commissioner Rogers, as is shown by the disposition to be made of a large number of steel ammunition boxes that were sent along. The boxes were too unwieldy to use in their original form, being four feet wide, three feet deep, and something over nine feet long, with ends, bottom and sides riveted together. The boxes will be taken apart, and the steel will be utilized in making road culverts.

Some of the trucks allotted by the government are already in use about the state. By spring it is expected that the entire outfit will be in perfect condition, when the big drive for good roads will be undertaken in earnest.

G. H. Dyer Co., Cambridge, Mass., manufacturers of Oxy-Acetylene welding equipment, has published a piston directory. This furnishes the prices on pistons, finished and semi-finished, standard and oversize, wrist pins and rings for numerous makes of pleasure vehicles and more than a hundred makes of trucks.

The Michigan State Highway Commissioners' Garage and Some of the Trucks Which Will be Put Into First-Class Shape

The Resiliency is Built in the Wheel

Sewell Cushion Wheels are furnished for Motor Trucks of from one-ton to seven-ton capacity

Six Years Without a Penny Repair Cost The Record of This Set of

Sewell Cushion Wheels

This five-ton, duplex moving van was equipped with Sewell Cushion Wheels in June, 1913. It is more than a huge truck. It is a double-capacity Van, a house on wheels. It carries a crew of three men. For more than six years this Van has been used for interurban hauls. It has hauled all sorts of loads over all sorts of roads, broken pavements, frozen clay, summer and winter—between sixty and seventy thousand miles—during these six years.

And not one of these Four Sewell Wheels has lost a minute or cost a penny for Repair. Moreover, a recent careful test showed that the rubber in these four wheels had lost none of its Resiliency. These four wheels are still good for many thousands of miles.

It is the Sewell Principle, the Resiliency Built in the Wheel, the Distribution of Weight and Road Shocks over forty per cent of the wheel, the Sewell Rubber Cushion that have for six years preserved the mechanism and life of this huge Van; that have made possible this extraordinary record for efficiency and economy.

This instance is merely one of hundreds of instances. For eleven years we have been designing, manufacuring and perfecting this Wheel of Rubber within a Wheel, to secure the all-essential Resiliency which gives truck and tires these added years of efficiency.

In 135 American cities 850 firms are re-ordering Sewell Wheels because they are duplicating the record of this five-ton moving van, equipped with Sewell Cushion Wheels.

Such is the national endorsement of the Sewell principle.

"The Resiliency is Built in the Wheel"

For Eleven Years We Have Been Building Resiliency into Motor Truck Wheels

The Sewell Cushion Wheel Company, Detroit, U. S. A.

Branches:

Baltimore, Md.	Cleveland, Ohio	Kansas City, Mo.	Newark, N. J.	Salt Lake City, Utah
Birmingham, Ala.	Columbus, Ohio	Los Angeles, Calif.	New York, N. Y.	San Francisco, Calif.
Boston, Mass.	Dallas, Texas	Louisville, Ky.	Omaha, Neb.	Seattle, Wash.
Buffalo, N. Y.	Dayton, Ohio	Macon, Ga.	Philadelphia, Pa.	Springfield, Mass.
Chicago, Ill.	Denver, Colo.	Memphis, Tenn.	Pittsburgh, Pa.	St. Louis, Mo.
Cincinnati, Ohio	Detroit, Mich.	Milwaukee, Wis.	Portland, Ore.	Tampa, Fla.
Clarksburg, W. Va.	Indianapolis, Ind.	Minneapolis, Minn.	Rochester, N. Y.	Washington, D. C.

Sewell Wheel Book to Truck Owners on Request

Duluth Wholesale Grocery Company Saves Over Thousand Dollars a Month by Efficient Truck Delivery

Uses Two Motor Trucks and Eight Removable Bodies and Has Eliminated All But One of Its Delivery Teams. Has Privilege of Leaving Bodies in Several Freight Depots, Thus Eliminating Waste Time

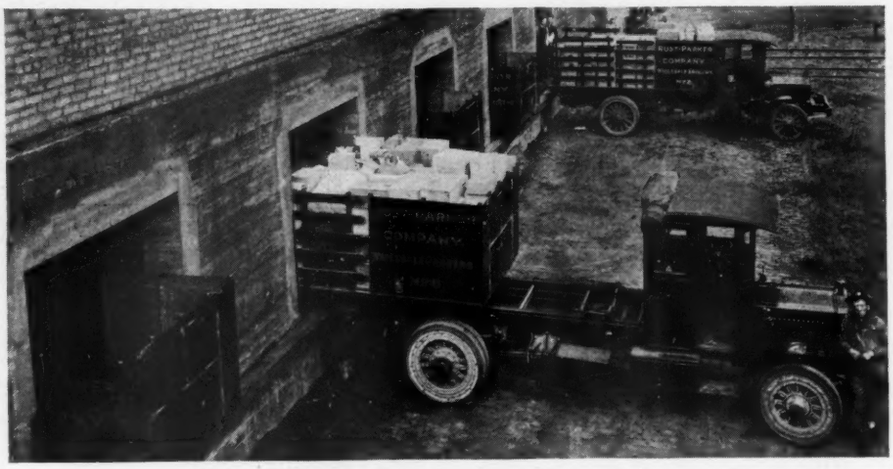
By A. V. COMINGS

EXAMPLES of efficient use of motor trucks in short haul work in the big cities of this country are growing more common every day, as big users of this means of transportation put more thought into solving the problems which enter into each particular line. But it is doubtful if there will be found anywhere a more concrete example of dollars and cents saving, which, translated into plain English, means earning, than shown in the development of motor transportation that is saving the Rust-Parker Co., of Duluth, Minn., over one thousand dollars a month.

Anticipate Still Better Success

H. R. Ketchum, general manager of the Rust-Parker Co., who has seen the company's tangled days of horse-drawn deliveries gradually merge into the present smooth running truck delivery system, is authority for the statement, and furthermore, he states that as soon as shipping-room system can be co-ordinated with the present motor truck delivery, the saving will run to an even higher figure.

The Rust-Parker Co. is one of the big wholesale grocery houses doing business in Duluth. Like the other big wholesale houses in Duluth, its plant is located on the lowest land in the city, and all its delivery hauls are up steep hills which just naturally make horses wear out faster than brakes on a flivver. The coming of motor trucks meant the end of the horse delivery system, but it was the installation of removable bodies on the trucks last January that cut the delivery costs almost unbelievably.



Exterior View of the Shipping Department. The Ground Floor Corresponds in Height to That of the Truck. Eight Doors Provide Accommodations for Eight Truck Bodies

Removable Bodies Net Big Saving

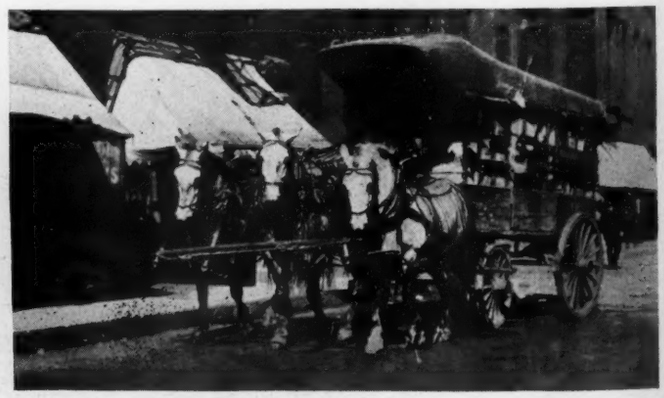
A year ago the Rust-Parker Co. was using six two-horse teams, one three-horse team, and two 3½-ton motor trucks, a Packard and a Federal, in handling its deliveries. And often had to hire extra teams and drays from local drayage companies during rush periods.

Today, due to the installation of the removable bodies, two trucks and one team are doing all the hauling, doing it easier, quicker, and over a thousand dollars a month cheaper. Pretty good system, that, one that motor truck agents and salesmen ought to study pretty carefully, and then go out and sell to every big wholesale company that has similar conditions to meet.

The building of the Rust-Parker Co. is ideal for the operation of this system. The shipping department is on the ground floor, just the right height for loading to the trucks, and is long enough that eight doors, accommodating the eight truck bodies, were easily arranged for. These doors are closed by rolling steel shutters at night.

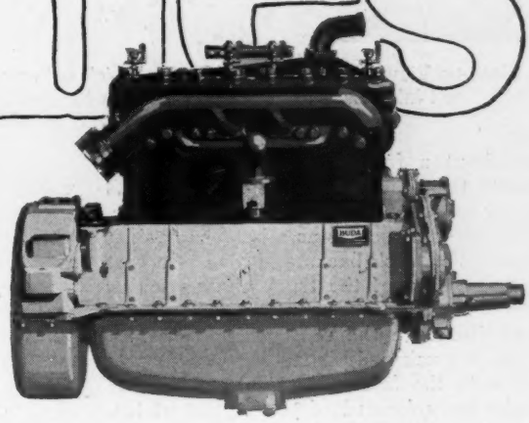
No special preparation was necessary for the truck bodies on the shipping floor, each rolling from its chassis out on to the concrete floor without the formality of even using a track.

Outside the door, however, is a string-



This Contrast Between the Old System and the New, Prominent as It Seems, Does in No Way Touch the Actual Difference of Operating Cost

Buda Engines



With new refinements to meet modern service conditions, Buda engines are intelligently built to perform the truck, tractor and passenger car work of today.

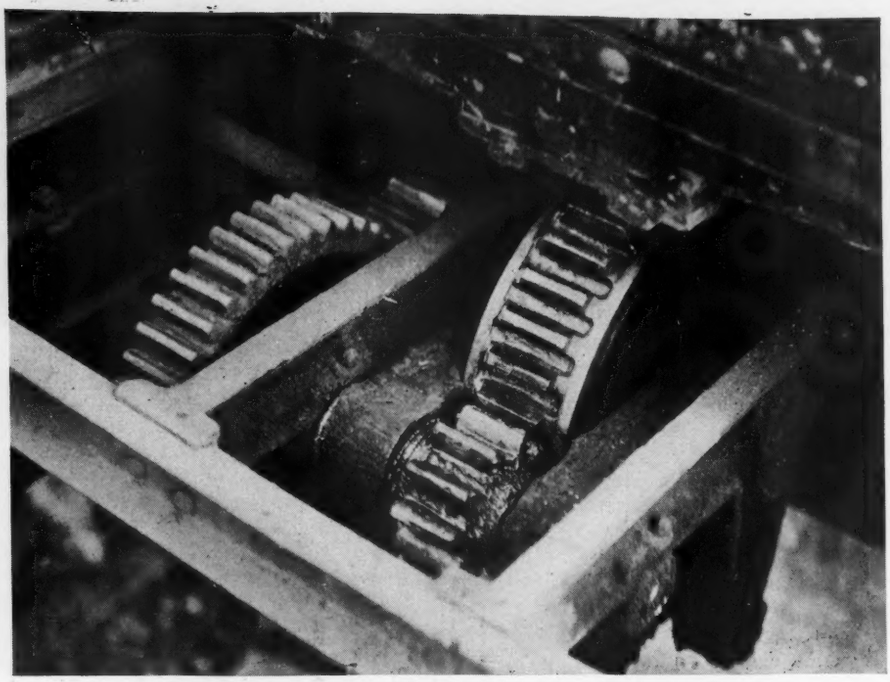
Standard mounting dimensions of Buda engines for solid- or pneumatic-tired models is an advanced feature of Buda design that truck engineers thoroughly appreciate.

This means that for the same model a correctly sized engine may be provided for solid tire service or a more powerful engine with the same mounting dimensions may be installed for speedier service with pneumatics.

In obviating the need of separate truck models for each tire service, progressive engineers are selecting Buda engines as standard equipment to simplify truck production.

THE BUDA COMPANY, *Harvey* (CHICAGO SUBURB), *Illinois*
ESTABLISHED 1881

BUDA
The
ENGINE



Close-up View Showing End of Rack, Which is Secured Under the Body, Engaged With the Pinion Located in the Center of the Rear of the Truck Chassis. This Pinion May be Raised or Lowered at Will by the Operator

er about a foot square and six inches lower than the sill of the door, with its outer top corner faced with a steel angle. This stringer serves as a bumper against which the truck backs and also as a rest for that part of the truck chassis which must be at the proper level to receive and discharge the removable bodies.

Each truck body is strongly constructed, with the forward, closed part of the stake body formed of ¼ in. steel plates. On the under side of each platform are eight rollers, 6 in. in diam., arranged four to the side and spaced so that the distance between them is same as from center to center of truck side frames.

In arranging the truck chassis to handle these removable bodies considerable ingenuity was shown and already improvements are contemplated that will make the system even more efficient.

It was found necessary to increase the height of the chassis, so channels of the proper depth were riveted to the side frames, flanges directed inward. Riveted to the top flange is the web of a 3-in. channel, with flanges extending upward, which forms the guiding track on which run the wheels on the under side of the bodies as they are loaded or removed.

Body Moving Mechanism

The mechanism for moving the bodies on and off the trucks has not been entirely successful, though it functions fairly well, everything considered. It consists of a rack and pinion device, the rack being bolted to the under side of the truck bodies, and the pinion being operated in the center of the rear of the truck chassis by a double reduction gear to a crank, which the truck operator turns. The pinion may be raised and lowered, to engage the rack, by the operator using his crank on another pinion which engages a toothed quadrant, raising or lowering the main device through a bell crank action. It is planned to supplant this device entirely by an endless chain belt, operating from the engine transmission, which will engage in a proper fastening on the under side of the truck body, moving the body off or on the chassis at the will of the operator.

Already the heavy loads have worn the concrete floor of the shipping room, where the bodies run in and out of the doorways, so that it takes a lot of power to get the loaded bodies on to the trucks.

These defects, however, are but natural to a new system such as this, and are not in any way fundamental. They are easily remedied.

Ingenius Locking Device

The device for locking the bodies to the truck chassis is simple and ingenius, and could hardly be improved upon. It has stood the test of the severest service very successfully.

Near the rear of the chassis, and about two feet aft of the cab, are heavy hooks bolted to the side frames and pointing toward the rear, with a space of about three inches between under side of hooks and the top of track channel webs.

As the removable body slips onto the truck, these hooks engage in heavy steel rods, bolted transversely at the proper places to the under side of the truck bodies. This holds the body securely to the chassis. To keep it from sliding backward, and disengaging from these hooks, two spring catches, mounted on a transverse shaft just aft of the driver's cab, automatically engage on links on the under side of the truck body, keeping it rigidly in place till the hooks are tripped by means of a lever near the rear of the chassis.

Another ingenius detail that has helped to make this system successful is the method of getting the truck chassis at the proper level and holding it there during the body moving process.

This was accomplished by bolting to the rear of each side frame a piece of ½ in. bar steel, so shaped that it formed a wedge, with the point to the rear, a flat side upward and the sloping side

Turning of the Crank, for Moving the Body, is Facilitated by a Double-Reduction Gear

ON YOUR PAYROLL

WHETHER poring over a blueprint, figuring a cost sheet, or mounting a ladder to inspect line shafting, the S K F representative virtually goes on your payroll the minute he enters your plant.

So every S K F man justifies the basic S K F policy. He is a salesman only as he serves.

Not to hear bearings exploited, but to absorb the latest ideas on reducing friction—this is why the manufacturer sends for the S K F sales engineer.

And what more authentic advice is to be had than the engineering knowledge of anti-friction experts, supported by the impartial research of thorough, well-equipped laboratories?

Manufacturers are invited to avail themselves of this service

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Hess-Bright Ball Bearings
S K F Ball Bearings
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Gronkvist Chucks
Transmission Hangers

downward. This sloping side engages on the top of the angle on the sleeper, just outside each door, mentioned previously, and as the truck backs up, the frame is raised to the proper position.

Reference to the drawings herewith will make plain the working of these various devices. A drawing of rack and pinion device has been omitted, as it is to be supplanted by a better method.

The system of dispatching the bodies and using the trucks to the greatest advantage has been given careful thought.

Manager Ketchum has arranged with all but one of the freight depots in Duluth to allow the loading and unloading of the removable bodies in one of their freight doors. This makes it possible for the truck to be doing other work where otherwise it would have to stay at the freight station during the loading and unloading periods.

No Bustle, Confusion or Delay. Quick, Efficient Shipping Service is Rendered by This System

Another Big Saving is Afforded by the Utilization of the Trucks in Other Lines of Work While the Bodies Are Being Loaded

Arrange With Freight Depots

The two trucks go to the freight stations the first thing each morning and by 8.30 a. m. the incoming freight is in the Rust-Parker receiving rooms. With the loaded bodies off the chassis, the trucks are then ready for the day's deliveries, and there are always loads ready to take on and distribute.

One of the big savings which has been noted through the removable body installation is in the added flexibility of the receiving and shipping force. The men can be used to much greater advantage, as it is no longer necessary to unload a body the minute the truck gets in, to release the truck. It leaves the load and goes on about its business, and from what I saw at the Rust-Parker shipping platform, the trucks are hauling loads about ninety per cent. of the time or more. The shifting of an empty body to a full capacity load was accomplished in mighty quick time in the instances that I watched.

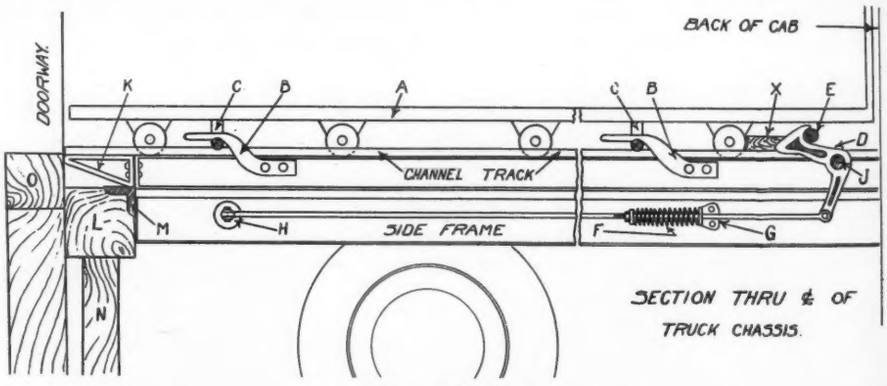
Exceptional Amount of Work Accomplished

These trucks each make approximately ten trips a day, and the tonnage they handle is surprising. The longest haul they are called upon to make is nearly ten miles, and the depot hauls are approximately a mile each way.

A 4-ton Packard truck has been added to the equipment as a precautionary measure, but this is seldom used.

All trucks are fitted with Sewell cushion wheels, which have proved very satisfactory on Duluth's rough pavements

Mr. Ketchum plans a system in the receiving and shipping departments that will eliminate one handling of goods from cars to outgoing trucks, and when this is perfected the saving brought about by the removable bodies will show even more favorably. Naturally, Mr. Ketchum and others in the Rust-Parker Co. are very enthusiastic over the showing made by their highly efficient motor delivery system, which has eliminated one of the greatest problems with which they had to cope in horse delivery days.



Key to Drawing

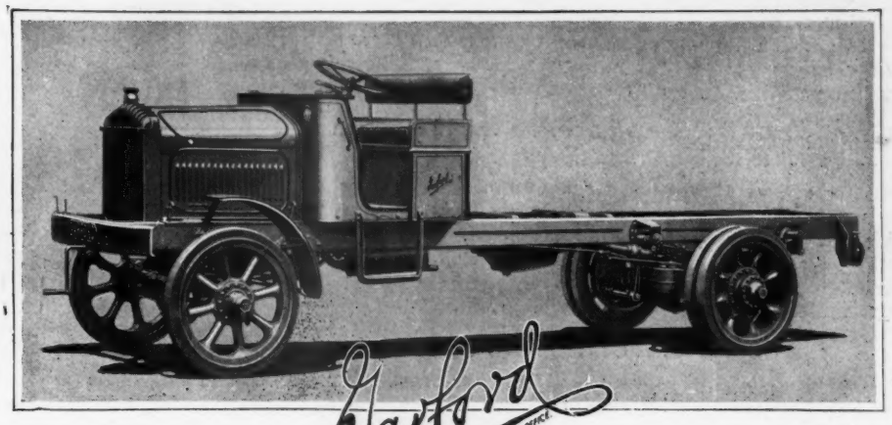
"A" is platform of truck body, supported on the chassis by the four wheels shown, resting in upturned channel on top of chassis. In position it rests against wooden bumper "X." "B-B" are forged hooks, engaging in links "C-C," fastened to under side of truck platform, holding platform to chassis. "D" is cast hook, keyed to shaft "J," and held up stiffly by spring "F," pressing against stop "G," riveted to side frame. There are two hooks, one on either side of the chassis, each keyed to the same shaft so that they work in unison. As body slides onto truck, the link "E" on under side of platform slips along beveled top of cast hook, depressing it till it passes point, when hook is snapped upward by spring "F" and holds body in place. A trip lever, passing through side of frame at "H," is used by driver to depress hook when body is to be removed. "K" is a wedge-shaped forging at rear of each side frame, supporting track. As truck backs into place, lower edge of this wedge slides over angle "M" on face of buffer stringer "L," supported by timber "N," thus raising truck frame and track to height level with door sill "O."

A Tree-Lined Highway for Motorists

WASHINGTON, D. C., Sept. 30.—The American Forestry Association is urging motorists to aid by planting trees along the highways, in beautifying the roads for which hundreds of millions of dollars have been spent by various national, state and local governing bodies. Trees planted along the highways will not only beautify and shade the roads, but their roots will strengthen and support the road foundations. It is suggested that motorists aid this work by joining the Forestry Association, so as to work in conformity with it, rather than go about planting undesirable trees in inappropriate places.

GARFORD

Announcing
New 3½ Ton Model $3990



Motor—4½x6"
Timken Axles

Steel Wheels
Four Speed Transmission

For Low Cost Ton-Mile

THIS newest Garford 3½ ton model is designed and built for the heavier tasks of hauling.

It is big, powerful—a giant in strength, and in every way lives up to Garford's standard of quality.

This new model embodies the best of Garford's twelve years of experience in the manufacture of high-grade motor trucks.

There is back of it a five million dollar company and a Definite System of Service.

Garford quality is maintained throughout, and the exceptional price is made possible only through quantity production.

The design, materials and manufacture of this new model all combine in securing *low cost ton-mile* delivery.

"USERS KNOW"

Dealers should communicate with us for unassigned territory

The Garford Motor Truck Company, Lima, Ohio

TRUCKS

Motor Truck Sales Managers Discuss Trade Evils and Their Remedies. Association Re-elects Its Officers*

View Truck Tour Movies and Hear Remarkable Results

THE Hotel Statler, Detroit, on November 7 and 8 was a beehive of the truck industry. The sales managers, members and delegates to the National Association of Motor Truck Sales Managers held their first business session on the morning of the 7th, the address of welcome being given by President Edward Hines, of the Detroit Automobile Club. That Detroit is a big city could not be doubted by the size of the key to it, which he turned over to President J. E. Tracy.

Mr. Hines said that the best truck salesman in their section was the good roads of Wayne County, and that the best truck salesman is always "another mile of good roads." He held up Michigan as an example, calling attention to the $2,000,000 now available for good roads and a bridge program already submitted for $1,600,000.

President Tracy, in his opening address, spoke of the phenomenal growth of the association in its one year, there now being sixty-five truck firms represented.

Eliminating the Trade-in Evils

Disassembling the old trucks, scrapping such parts as are actually worn out and cataloging and using the parts which are really fit for replacements, was suggested to the association by J. W. Allen, manager of the New York branch of the Service Motor Truck Co., as the most effective means of eliminating the trade-in evil. He proposed that catalogs be issued at stated intervals by the makers, giving the market value of the old parts which are suitable for replacement work. He said that in the printing press, the piano and typewriter business, old instruments or machines are destroyed and not traded in at fabulous prices as in the truck industry. He hit straight from the shoulder and apparently convinced the assembly that his plan was feasible and well worth considering. President Tracy said that a committee would be appointed for the purpose of further investigation of the subject.

The subject was further continued by H. H. Shuart, Secretary of the Detroit Automobile Dealers' Association, who outlined the methods which have been successfully applied by his association. These sixteen Detroit distributors make reports on used trucks which are available to their members. The first report gives the name of the truck, capacity, type of body, year, the price at which it was sold, whether the body was "rebuilt," "as is," or "overhauled." The second report has in tabulated form the trade-ins of the various trucks together with the prices. If the dealer juggles the price and puts it too high he is damaging himself as he runs the price up. If he puts it in at too low a figure, it makes it appear that his truck depreciates faster than his competitors. The result is that the prices are usually stated correctly. Their meetings are held separately from the passenger car men. The scheme has now been in operation four months.

Motor Truck Legislation

General Manager Al Reeves, of the National Automobile Chamber of Commerce, outlined to the convention the present status of adverse legislation, licensing and motor truck taxation as it exists throughout the country. He said that trucks represented but 10 per cent. of the road traffic of the country but 20 per cent. of the value. "Sixty million dollars will be paid in registration fees by the motorists of the United States this year."

He spoke of the Pennsylvania law which goes into effect January 1, requiring each truck to carry its capacity on a sign having letters three inches high, as taxes are based upon chassis weight and capacity. He thought this would help to stop overloading.

In North Carolina the tax of $500 for selling in the state is being passed on to the dealers. The result has been that the dealers' associations are trying to have this law repealed. The N. A. C. C. has a plan which will be sent to any manufacturer desiring to sell in that state.

If the manufacturer sells a chassis to a dealer and the dealer signs a contract by which he is to complete it with a body and sell it as a finished truck the dealer then pays the Federal tax.

W. M. Connely, member of the Michigan State Legislature, during the discussion suggested that motor vehicle committees be appointed in the various state legislatures.

Pneumatic Tire and Truck Sales

The effect of pneumatic tires on truck sales was presented to the meeting by C. A. Wales, sales manager of the Locomobile Co. He said that there were but 110 trucks fitted with 44 x 10 in. tires and not over 300 trucks of 4 tons or over on pneumatics. Preferential tariff rates are given by most states to trucks on pneumatics. He also said that if the trucks were taken off the roads of the State of New York that the railroad system would absolutely break down, owing to its inability to haul the additional freight which is now being cared for by the trucks. He spoke also of the facility with which France handles freight on small 10-ton flat cars, in fact, most of them with no greater capacity than a truck. This he used as an argument for the future possibility of a tremendously wide use of trucks for freight handling in competition with the railroads. He deplored the lack of good truck salesmen.

After luncheon F. W. Fenn, secretary of the Motor Truck Committee of the N. A. C. C., pointed out how trucks could be sold to the farmers and operators of rural motor express lines.

The attitude of the banks toward financing motor trucks was discussed by Vice-President C. R. Talbot, of the National Bank of Commerce, Detroit. A. J. Whipple, general sales manager for the Diamond T Motor Car Co., presented a paper on "Good Trade Practices."

The meeting was then declared closed except to members and the subject of Vocational Selling and Vocational Advertising was presented by L. B. Dudley, advertising manager of the Federal Motor Truck Co.

A. E. Schafer, sales manager of the Gramm-Bernstein Motor Truck Co., presented the subject "Should Trucks Be Manufactured and Sold Completely Equipped?"

Banquet Big Success

In the evening the banquet was attended by a most enthusiastic crowd for a so-called "dry" state. It was noticeable, however, that several were drinking liquids from the souvenir ash trays and collapsible cups, while extra editions of the NAOMTSM were noisily circulated by the newsboys, which gave the real facts in regard to many truck companies. A performance which will be remembered for some time was put on by the entertainers and the banquet was voted a great success.

The business for the following year was outlined by President Tracy and plans for the next meeting discussed. The association then proceeded to the election of officers which resulted in the re-election of J. E. Tracy as president; Hal T. Boulden, first vice-president; W. D. Rightmire, second vice-president; E. T. Herbig, secretary; A. R. Fernald, treasurer, and J. M. Carney, executive secretary.

The gathering was enthused by Orator A. T. Kroh, who talked on the wonderful results accomplished by the Motor Truck Development Tour of the association. The moving pictures were most comprehensive and convincing. The other speakers were Birch, Whipple, Herbig and Hon. Luther A. Brown, of Iowa. All were enthusiastic boosters for a similar tour another year.

*Editor's Note:—Owing to the fact that the convention was still in session while this issue was going to press, photographs, detailed discussions, papers, etc., will be given in our next issue.

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"NORMA"

PRECISION BALL BEARINGS

(PATENTED)

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A realization of this fact, on the part of builders of automotive units and electrical apparatus therefore, explains the vast preponderance of "NORMA" equipped magnetos and lighting generators in the automotive world. Responsible builders know that "NORMA" gives security against bearing troubles.

Be *Sure*—See That Your Electrical Apparatus is "NORMA" Equipped

THE NORMA COMPANY OF AMERICA

1799 BROADWAY NEW YORK

Ball, Roller, Thrust and Combination Bearings

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It makes no difference which form of final drive you select, if the axle of your choice is encased in a Bossert Pressed Steel Axle Housing.

Without entering the controversy as to which form is most efficient, we are yet able to make one suggestion for the betterment of *all* truck axles. This consists in insisting that the axles on the trucks you make or sell be enclosed in

BOSSERT
Pressed Steel Axle Housings

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This strength and dependability is coupled with lightness. The axle that operates within a Bossert Axle Housing is just as efficient but it weighs less and, therefore, is more economical, as it does not add to the surplus weight of the truck assembly.

Truck makers who realize the many advantages of Pressed Steel Axle Housings — made "the Bossert Way" — over the heavy castings formerly used, are invited to write at once to our Engineering Department, enclosing blueprints and specifications of their trucks.

We make every part of pressed steel that has ever been used on motor trucks, cars and tractors.

Back of this is an organization specially equipped and prepared to deliver Bossert Pressed Steel Axle Housings in any quantities you may desire.

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